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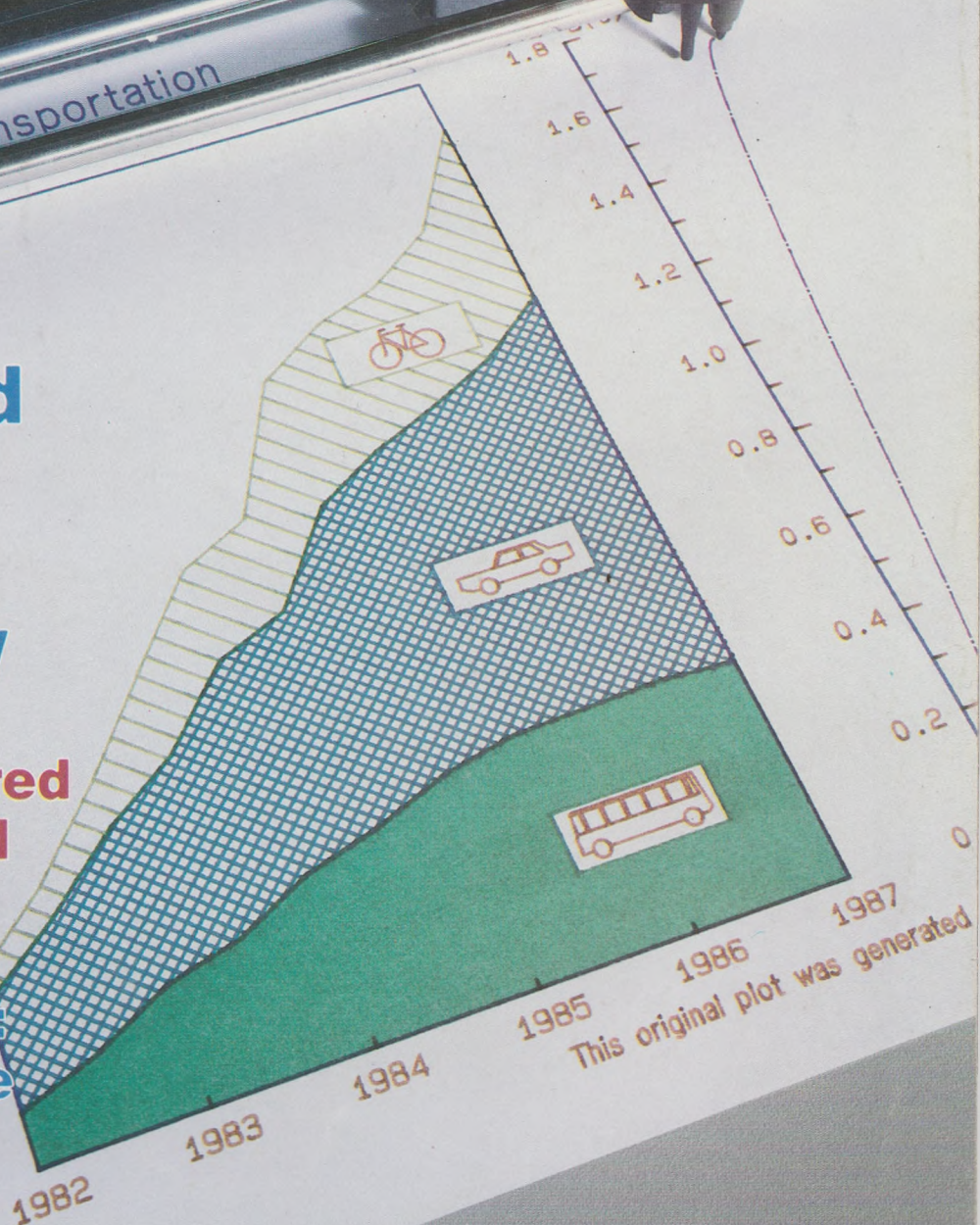
The Practical Journal of Advanced Computing

## Printers and Plotters— Trends in Technology

**HP's High-Powered  
7550 Plotter and  
LaserJet Printer**

**The Portable PC:  
IBM's Own Clone**

Transportation





## PALANTIR SOFTWARE MAKES WORD PROCESSING

# E

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Palantir Software is designed to make you a word processing expert in a very short time.

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# A

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# S

### SIMPLE

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# Y

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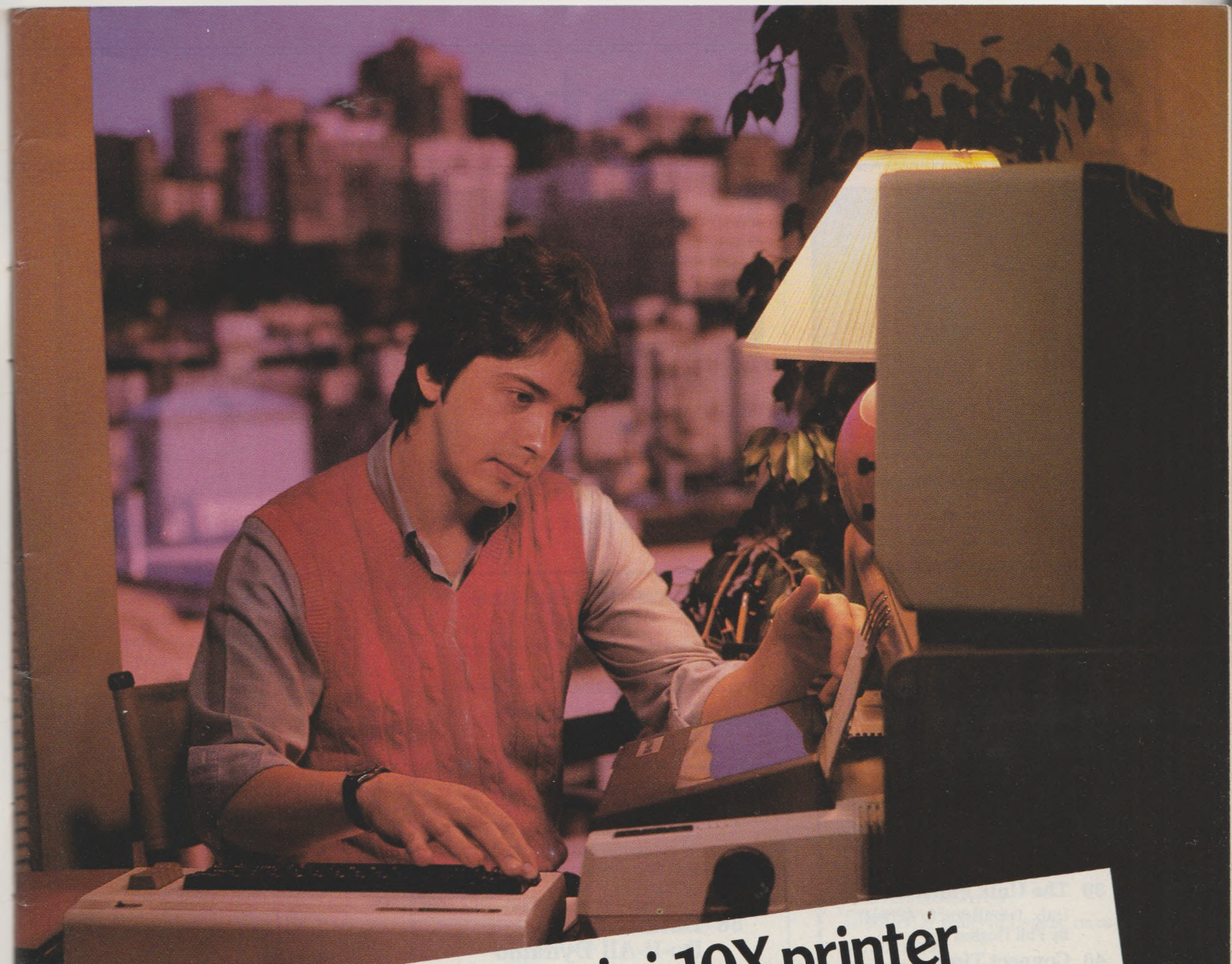
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*Steven Clarke—San Francisco, California*

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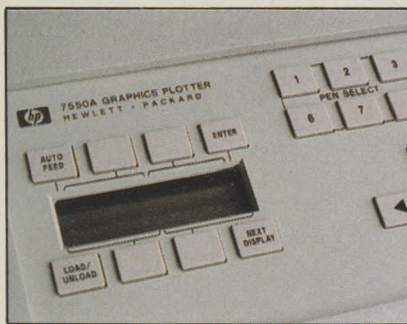
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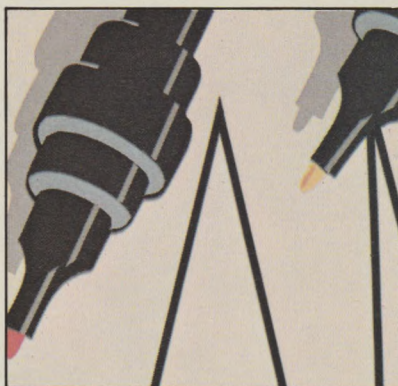




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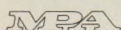
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By Eric Grevstad.



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Cover design by Howard Happ.

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The Practical Journal of Advanced Computing

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# The Edit Mode

By Keith Thompson

## Will Computers Go Homeless?

New Home Users  
Need Reasons  
To Buy

We've been confronted in recent weeks by reports that sales projections of home computers are off—way off—for 1984.

From the revised estimates of such microcomputer industry prognosticators as Future Computing (Richardson, TX) and The Yankee Group (Boston, MA), it seems that the growth curve, which bolted upwards last year, will be a lot flatter than expected for the rest of this year.

Original predictions estimated sales of more than seven million home units. In the wake of dealer reports, sales on the order of less than five million are more likely for this year. Next year's predictions will undoubtedly be a lot more conservative. What has happened?

### Tell Me Why

Computers have nearly saturated that first consumer tier composed of pioneers and the high-tech curious. Sales to these individuals were relatively easy and inexpensive. These are the people who must have a high-tech product because it's new and, therefore, exciting.

In sales, there's a saying that ten percent of the marketplace con-

sumes 80 percent of a product. After the first sale, every successive sale becomes more expensive. The same adage applies to the micro marketplace. Another stratum of computer users must be given reasons to buy; a decision to buy a personal computer isn't an impulse decision.

### Who's to Blame?

Manufacturers are partly to blame for the current slump. They've been imitating one another with such fervor that they've lost the vision to create entirely new markets. For many of them, this lack of marketing vision will result in closed doors within months.

This downward revision in sales projections comes at a time when microcomputer advertising has reached record heights. Companies have injected unprecedented funds into ad campaigns. Microcomputing advertising has extended into the expensive mass media. Micro ads on television, in weekly news magazines and on billboards vie for attention alongside cookies, deodorant and dog food.

These advertising campaigns may stimulate consumers enough to in-

crease foot traffic at dealers. But what will await the prospective buyer there?

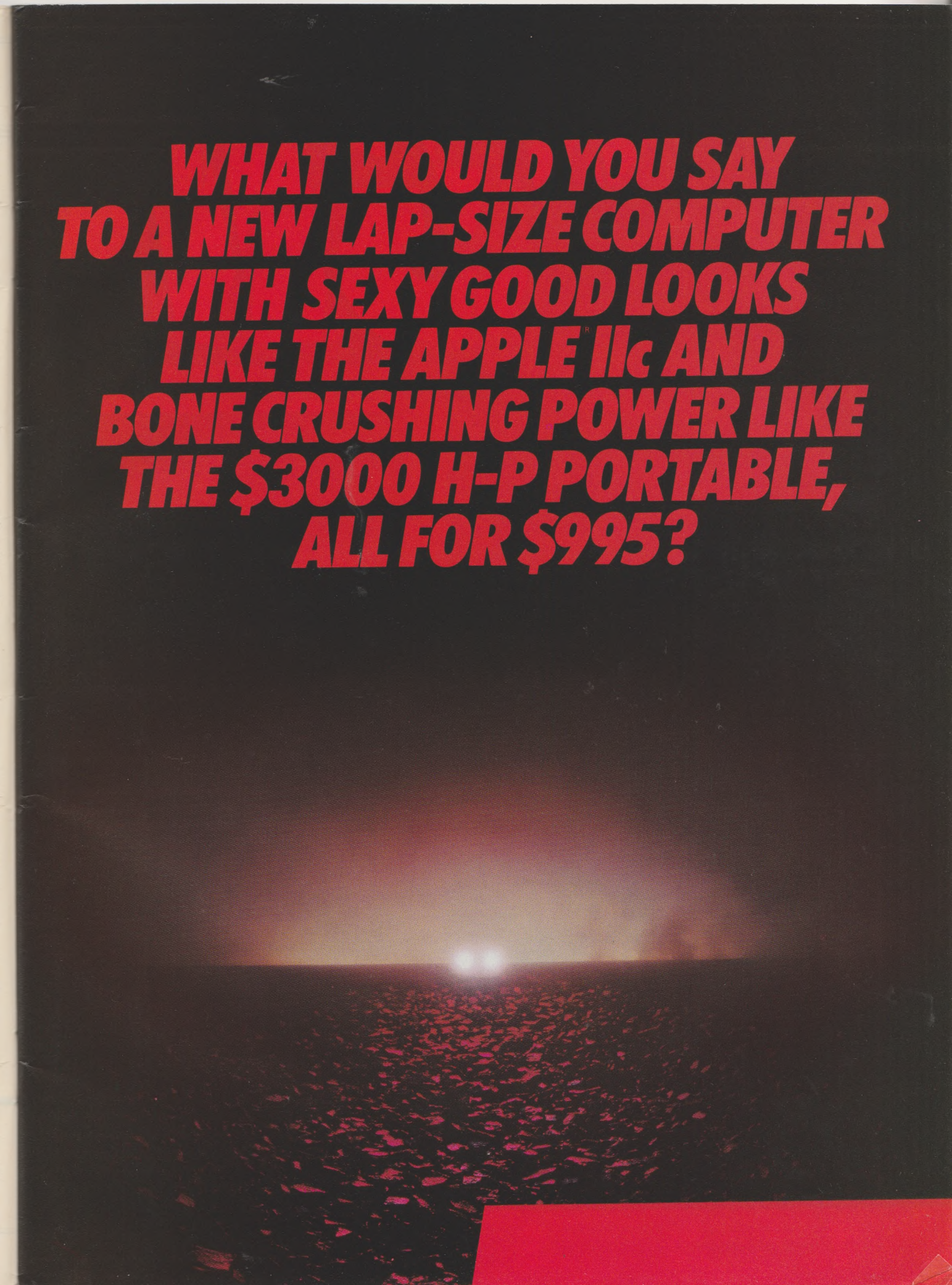
### New Twist Needed

If micros are to become common household appliances, then manufacturers will have to do more than spend massive amounts of money on advertising. They must make machines that are of some practical value to the masses. Where are the promised products to control our homes with comfort and efficiency? Enough of recipe filers and check-book balancers. We misread the market if we assume that the home user wants or needs a word processor or spreadsheet. What twist will make a home computer indispensable?

It's my opinion that there's no mass market in the foreseeable future for a "serious" home computer. The closest that most consumers will ever come to a home computer are the microchips that are being designed and built into everything from cars to toasters. They're so "user-friendly" and useful that consumers won't even realize that they're there. Isn't this the way it should be? Maybe the home revolution has already happened. □



**WHAT WOULD YOU SAY  
TO A NEW LAP-SIZE COMPUTER  
WITH SEXY GOOD LOOKS  
LIKE THE APPLE IIc AND  
BONE CRUSHING POWER LIKE  
THE \$3000 H-P PORTABLE,  
ALL FOR \$995?**





# “GIM

*Of course you want it.*

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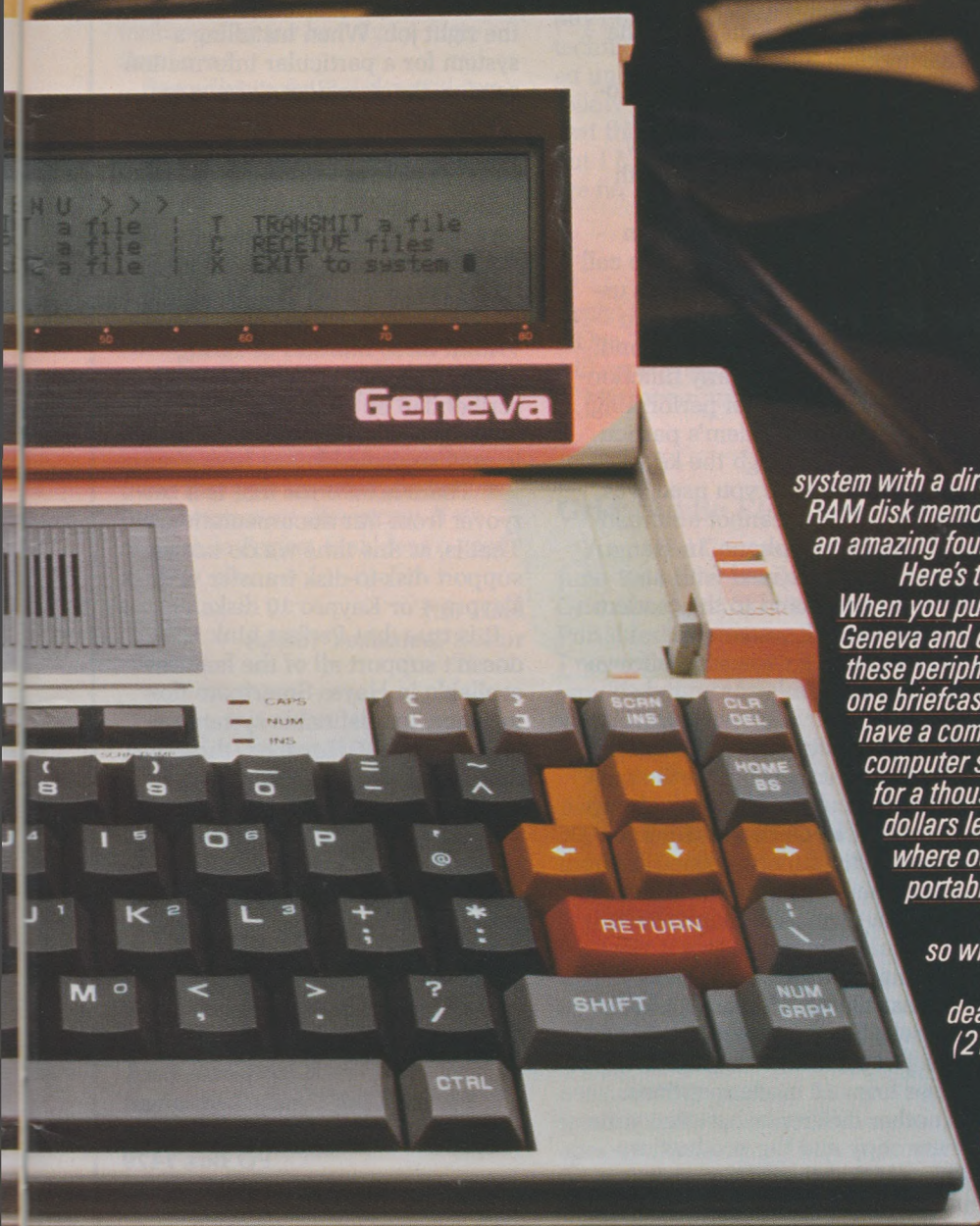
*The Epson Geneva offers a complete collection of advanced, battery-powered mini-peripherals. Customize your perfect computer*



# E P S O N



# TIME."



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# G E N E V A



# Letters

## **Turbo Pascal: Right On!**

Your review of Turbo Pascal (June *Microcomputing*, p. 117) is right on! It is a fantastic bargain.

Several comments should be added and/or emphasized. Turbo Pascal is available for CP/M-80 and CP/M-86 systems, as well as for those operating on PC DOS and MS DOS. Moreover, it comes with an easy installation program. Within an hour of receiving it, I had it up and running on my Kaypro II.

Not only is the accompanying text editor similar to WordStar, but you can also actually write and edit Turbo Pascal programs with your WordStar software, if you have this package. The demonstration programs can be easily studied by calling them up as WordStar files.

Turbo Pascal is a software development tool in every sense, and the programs compiled and saved with Turbo can then be run without Turbo and, of course, without any knowledge of Pascal.

Finally, let me mention another good book for Pascal beginners. It is *Simple PASCAL* by James J. McGregor and Alan H. Watt of the University of Sheffield in England. The book is published in the United States by Computer Science Press Inc., 11 Taft Court, Rockville, MD 20850. With this tutorial and Turbo, it is possible for a beginner to be writing practical Pascal programs in a week's time!

**Jim Irwin, Ph.D.  
Lake Oswego, OR**

## **A Response From Perfect Software**

Thank you for taking the time to review Perfect Link (March *Microcomputing*, p. 74). Although we don't agree with your conclusion, we are always pleased to see our

products described and reviewed in magazines like *Microcomputing*.

There are, however, a few points I'd like to clarify:

1. You stated, "Both programs support intelligent modems like the Hayes Smartmodem, but Smartcom II supports them a little better." In fact, Perfect Link not only supports modems "like" the Smartmodem, but also modems "like" those produced by U.S. Robotics, Novation, MultiModem, Anchor, Bizcomp, Rixon, TNW, Pop-Com and many others, both autodial and manual-dial.

Perfect Link's install program provides an automatic setup to call the major information services using any of the above modems at either 300 or 1200 bits per second. Perfect Link supports any function a modem is capable of performing; simply enter the modem's particular command through the keyboard. An example you used was that Perfect Link cannot automatically answer the phone. In fact, a system can be defined with an autoexec command to the modem to place itself in autoanswer mode—all that's necessary is to know the modem's command sequence.

2. Apparently, your review copy of Perfect Link was one of the pre-production copies. You brought up a point that since Perfect Link relies on the ten function keys, there couldn't be more than ten selections on a menu. Although this is true for a single menu, it is a simple matter to make another menu screen available. The latest Modem Selection Menus in the installation program allow users to choose from 19 modem options.

Another difference between your review copy and the production version is that in addition to automatically installing systems to connect with The Source, CompuServe, Dow Jones, NewsNet, Knowledge Index and the Official Airline Guide, Perfect Link will also install systems for Comp-U-

Store, Western Union's EasyLink service and MCI Mail. For EasyLink and MCI Mail, the 20 macro keys have been predefined to take advantage of those services' most commonly used options.

3. One feature that you failed to mention is Perfect Link's ability to select the right phone number for the right job. When installing a system for a particular information service, the user doesn't have to search through user's guides or phone number lists to find the switching network number that will connect to the information service he or she subscribes to. Perfect Link comes with a database containing access numbers for the United States and Canada. Within three minutes of sitting down at the computer a new subscriber can be connected to any of the major information or electronic mail services.

4. There is an error that is a carryover from our documentation. That is, at this time we do not yet support disk-to-disk transfer with Kaypro 4 or Kaypro 10 disks.

It is true that Perfect Link doesn't support all of the features available in Hayes Smartcom (for instance, ten definable systems as opposed to 26). However, through our testing, we have found the automatic installation program and the disk-to-disk transfer capability to be prized features that you perhaps did not weight enough in your review.

Again, we were delighted that you hold Perfect Link in high enough regard to discuss it in such depth.

**Martin Lenk  
Perfect Link Product Manager  
Perfect Software  
PO Box 1479  
Eugene, OR 97440**

Reply:

Regarding point 1, it's true that Perfect Link supports more modems than Smartcom II does. My review should have reflected that. My con-



clusion that "Smartcom II supports them better," however, was based on Smartcom II's support for tone dialing and its retry-until-carrier and autoanswer features, features which Perfect Link lacks.

Concerning point 2, the version of Perfect Link provided to us was claimed to be in its final form. I'm pleased to see that preprogrammed macros have been added and that more modems are available on the modem-selection menu. I maintain, however, that Perfect Link's user interface relies too heavily on function keys.

Regarding point 3, I devoted two paragraphs to Perfect Link's easy installation process. I also referred to the phone number database by saying "it displays a list of cities... that have switching networks and asks you to select the one closest to you."

I agree that the automatic installation program and the disk-to-disk transfer features are valuable. When it comes right down to it, though, a communications program's most valuable features are those that you use when on-line. In that department, Smartcom II excels, while Perfect Link does a good job.

**Jim Heid**  
Senior Technical Editor

### A Code Correction

In the May 1984 issue of *Microcomputing*, you published my article, "The Key(s) to Adaptability" (p. 102). I have discovered an error in the software listing. On p. 109 of the magazine there is a section of code that looks like this:

```
MULNXT MOV A,H
        CPI 10H
        JZ KEYOFF
        MOV A,M
        INX H
        ANI 80H
        JNZ MULNXT
        DCR C
        JZ MULNXT
```

The last three instructions should look like this:

```
JZ MULNXT
DCR C
JNZ MULNXT
```

I hope this hasn't caused your readers any inconvenience.

**Stuart Ball**  
Cedar Rapids, IA

### Looking to Add A Dimension

I am interested in getting a Dimension 68000 computer. I have read the well-written review in the February 1984 *Microcomputing* (my compliments to Jim Heid's technical expertise) and have waited until now for the promised follow-up review. I've been hoping that there would be other reviews, but I haven't seen any. Also, there are no dealers in the Boston area.

**Kenneth K. Yee**  
Boston, MA

Reply:

Our "Dimension Revisited" story will appear in the November issue of *Microcomputing*. Stay tuned.

### Grid: Subtle Elegance

Your Grid Compass article in the June 1984 *Microcomputing* ("The Grid Compass: The Porsche of Portables?", p. 88) really hit home. I never thought any publication would write a comprehensive review. Now it seems everyone has found the next-generation system.

Yes, it is expensive (about one pound of gold). Yes, only Fortune 500 executives can afford it. Yes, the U.S. government can buy them like there is no tomorrow (especially the exotic Compass 1107). But Grid did it first and no other system is as well-designed. I nominate its subtle elegance for the Museum of Modern Art.

Now the Japanese will market a comparable system in two years for \$2500. So what is Grid's response? I hope they use a full color, liquid crystal display with twice the area, install a super microprocessor (a CMOS Digital Equipment Corporation MicroVAX chip set would satiate academics and the Department of Defense), include a Witek array

processor with 30 million floating point operations per second, reserve some space for an "expert system," offer a totally solid state mass storage system (maybe five-megabyte clustered chip packages), and a cellular mobile communications system. A reduction in length and weight plus an internal rechargeable battery pack would fulfill the "must do" list for absolute portability. An advanced integrated multifunction software package would perform numerical/symbolic/stochastic simulation, computer-aided design (CAD), computer-aided engineering (CAE), computer-aided business (CAB), and reserve some space for an "expert system."

Oh, yes! Japan will have a comparable system by...

**Marshall Chee**  
Los Angeles, CA

### Inside Epson

I enjoyed your piece on HX-20 software (June *Microcomputing*, p. 102). Perhaps you can give me some advice. I'd like to get more involved in machine/assembly language, but Epson's refusal to part with information on the OS hooks, 6301 coding and so on is terribly frustrating.

How do I tie into the obviously small group of HX-20 users? Do you know of any good sources?

**H.C. Branch**  
1700 Canterbury Common  
Annapolis, MD 21401

Reply:

If it's HX-20 internals you're after, check out "A Quick and Dirty Disassembler for the HX-20," which we published in our December 1983 issue (p. 94).

There's probably an HX-20 user's group in or near your area. How about it, readers? Is anybody digging into the HX-20?

**Editors**

### Where's the CP/M?

I read with great interest your article on the Apple IIc ("The Ap-



ple IIc: Petite Yet Powerful," *Microcomputing*, July 1984, p. 60). This newest Apple wondermachine is certainly impressive. However, I was somewhat dismayed to find that the IIc has one serious drawback and a distinct inconvenience.

The drawback refers to the lack of compatibility with CP/M-based software. As you and the people at Apple well know, many software packages in use today are CP/M bound. By precluding expansionability, Apple has *de facto* excluded CP/M from its IIc.

Quite a few of Apple II Plus users like myself were waiting for this Apple portable; for some it meant a second micro to use at home or on trips. What does Apple expect us to do: discard our CP/M packages, programs and databases?

As to the inconvenience, I wonder how a micro can call itself truly portable without an accompanying battery pack. Did it represent such an insurmountable design challenge?

These two inconsiderations may well cost Apple a sector of the less-than-novice market. For my part, I'm disappointed and will wait for another manufacturer to come out with a CP/M-compatible, battery-packed version of the IIc; a Franklin portable, perhaps?

**Roberto M. Saco  
Coral Gables, FL**

Reply:

Our guess is that third-party manufacturers will produce an external box to allow you to run CP/M. The problem, though, is that it will be external—definitely not very convenient.

The same holds true with the external battery pack. The one we've seen (sold by Diskwasher) is considerably larger and heavier than the IIc itself.

A better word to describe the IIc is "transportable" rather than "portable."

**Editors**

## Subliminal Influence: Nothing to Fear?

A colleague recently handed me a copy of your April issue that includes your column "A Clockwork Commodore" (Publisher's Remarks, p. 6). Since I teach an introductory advertising course, I am constantly asked questions about the power and influence of subliminal communications. As a scholar and educator, such questions have prompted me to thoroughly review the research on this subject.

Your column asserts that these subliminal messages will change behavior and then discusses the potential applications. What you probably did not know is that the influence of subliminal communications on people's behavior has been the subject of research for decades. The findings? No research and/or theoretical rationale exists to support the intuitive belief held by many people that subliminal directives can influence behavior or beliefs.

Do some advertisers use subliminal messages? The question is irrelevant—even if they do, that does not mean the messages influence people, any more than the popularity of copper bracelets means the products cure arthritis. To many, the possible "power" of subliminal messages has great intuitive appeal. However, as my friend H.R. Havoc says, "There are many things that 'sound' right or 'appear' true and are repeated as facts by the listeners, but a statement does not become a fact just because it is often repeated."

Let companies sell their subliminal software, assuming you do not mind people spending money on products that do not deliver promised benefits. I fear it not.

**Herbert J. Rotfeld  
University Park, PA**

## Sneak Previews

Next month, the Epson PX-8 grabs the *Microcomputing* spotlight. From the company that brought you the first laptop computer (the HX-20) comes this 64KB, CP/M 2.2 machine. The PX-8 offers an 8×80 flip-up LCD, Basic, WordStar and a spreadsheet/scheduler program in ROM capsules—for less than \$1000.

If you're in the market for a word processor, or if you're just curious as to what's available, then don't miss Tom Bonoma's word processor review. In the first of his two-part article, Tom covers Office Writer 2.0, the Leading Edge Word Processor, VolksWriter Deluxe and Microsoft Word revision 1.1.

If your Macintosh is begging for more memory, don't miss the battle of the Mac hard disks. Senior Technical Editor Jim Heid compares Tecmar's Mac Drive and Davong's Mac Disk.

In October, *Microcomputing* launches a new department called Express Check-Outs. This section does what its name implies—it provides quick reviews of exciting new products. All reviews will be written by members of our highly skilled, yet witty, staff.

In the review department we'll tackle—

- Habadex, a Macintosh database management program that claims to do everything from keeping your appointment book to dialing your phone.

- Protalker, a hardware/software speech synthesizer for the Heath/Zenith 100.

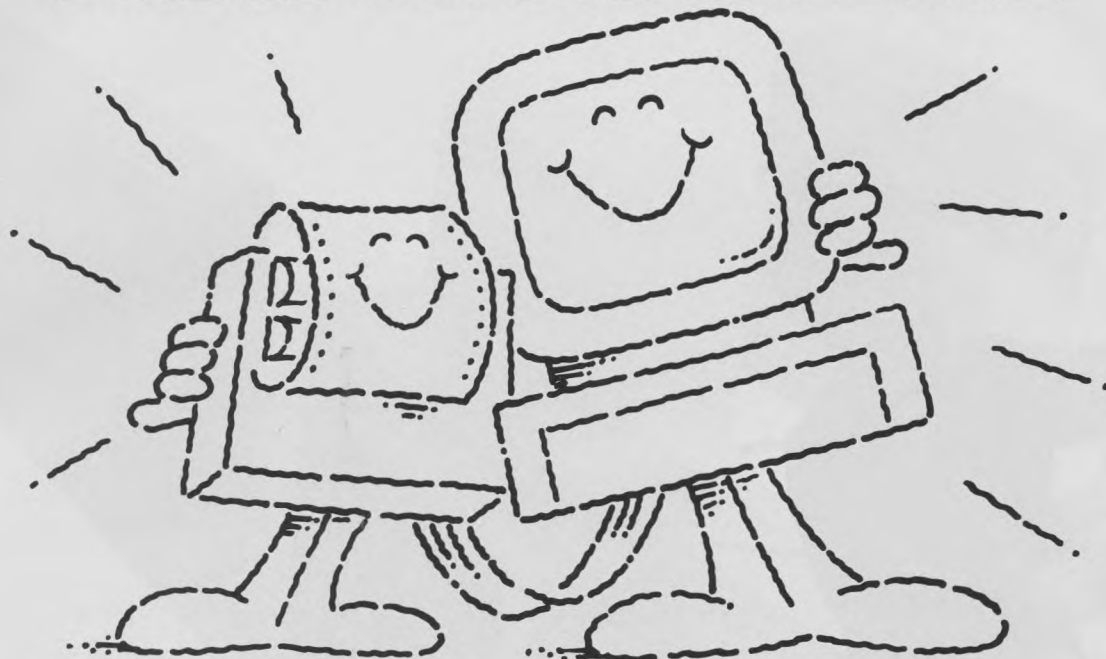
- Prokey 3.0 and SmartKey II Plus, two packages that let you program function and macro commands into your Apple or IBM keyboard.

- CopyLink PC and PC/Intercom, two communications programs that also emulate mainframe terminals. The former is available in more than 30 formats; the latter is available for the IBM PC, Tandy 2000 and Zenith Z-100.

All this and more in your next issue of *Microcomputing*.



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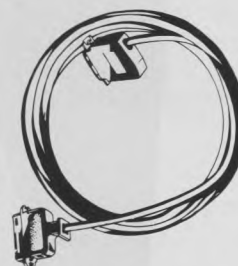
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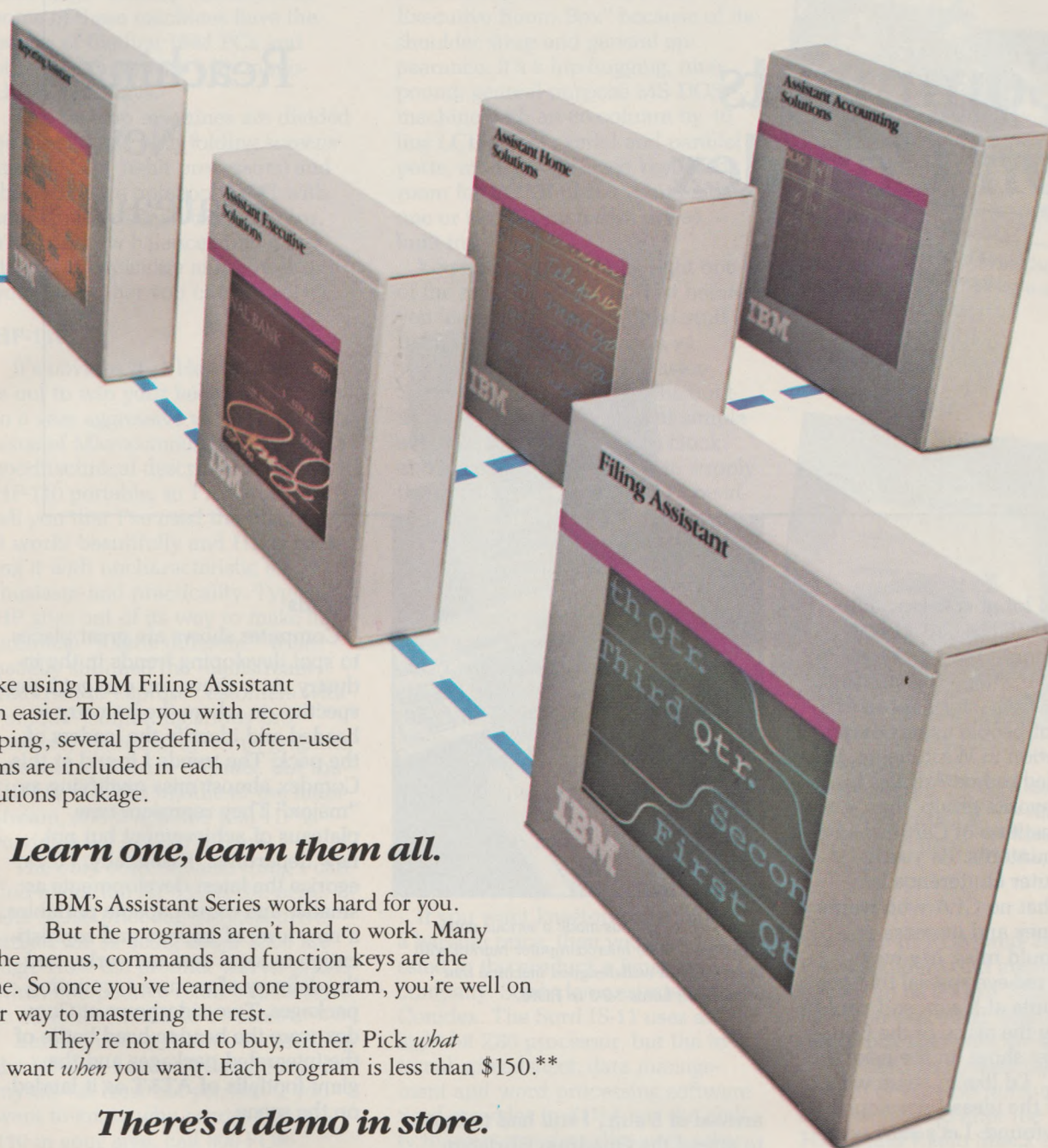
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# Overview

By Frank J. Derfler, Jr.

## Comments On Comdex

## Reaching New Plateaus

I've done a lot of speaking and traveling over the last 30 days. I started the month giving a course in data communications in San Francisco. A few days later I spoke to a conference of people using computers in education in Washington, DC. Then I headed to Los Angeles to speak to a favorite group, the American Institute of Certified Public Accountants. Its yearly microcomputer conference is something that no CPA who wants to make money and increase productivity should miss. My next flight was a red-eye special that got me into Atlanta at 5 a.m. so I could start walking the aisles of the Comdex computer show. In the next two "Overviews," I'd like to share with you some of the ideas I developed and things I found. Let's start with Comdex.

### Comdex in Atlanta

Comdex in Atlanta is big and sprawling. It takes up three major display facilities separated by several miles. But the walking and talking is always worth the trip. Although I



*Hewlett-Packard has made a serious entry into the portable microcomputer market with the HP-110, a well-designed machine that comes with Lotus 1-2-3 in ROM.*

arrived at 5 a.m., I still had to hurry to attend the Quadram Christian Foundation Quality of Life breakfast. The Quadram Christian Foundation is a separate charitable organization set up by Quadram's Leland Strange and others in the company. They do a wonderful job of injecting some spiritual value into what is otherwise a very plastic and silicon event.

### Trends

Computer shows are great places to spot developing trends in the industry. At a show you can get a perspective on where the industry is headed and identify the leaders of the pack. The trends I found at this Comdex almost miss qualifying as "major." They represent new plateaus of achievement but not new departures. Essentially, I'd categorize the latest developments as: smaller and more capable portables, a new level of interest and sophistication in local area networks, and the delivery of mature accounting packages. Two sideshows at Comdex were the head-to-head battle of the integrated packages and the giant footfalls of AT&T as it landed on the scene.

### The Battle for Your Lap

Look out, they're starting to fight over who's going to sit in your lap! The newest round of kneetop computers have some eye-catching capabilities. These new machines have gained the ability to share data



## Overview

and sometimes program files with their larger desktop cousins, and some of these machines have the power of the first IBM PCs and other 16-bit systems with monochrome displays.

The kneetop machines are divided between those with folding screens (and usually 16-bit processors) and those that are notebook-sized with some breed of eight-bit processor. You can now balance almost any degree of capability and power on your knees that you can afford.

### HP-110

It's obvious that Hewlett-Packard is out to win your hearts and minds in a very aggressive way. The June issue of *Microcomputing* gives you a good technical description of the HP-110 portable, so I need only to tell you that I've used the machine, it works beautifully and HP is backing it with uncharacteristic enthusiasm and practicality. Typically, HP goes out of its way to make its products "a little different." It has usually shunned the mainstream and tried to capture customers with "unique" communications procedures, operating systems, graphics sets and disk drive formats. But the HP-110 is in the middle of the mainstream, and it appears that HP is rowing hard to keep it there.

The only objectionable thing I can find about the HP-110 is the price. The \$2999 price tag (no disk drive) strikes me as being about \$500 too high. How the product will be priced when competitive retail outlets start to carry it remains to be seen.

But as much as I am impressed by the HP-110, I haven't bought one for myself—at least not yet. But if you want to know who carries the HP-110 in your area, call 800-FOR-HPPC.

### Morrow Pivot

If a portable with a disk drive is what you want, then Morrow is ready to meet your needs. Prototypes of the Morrow Pivot were shown at Comdex and the combination of capabilities is impressive.

The observers in the Comdex aisles immediately dubbed the Pivot "The Executive Boom Box" because of its shoulder strap and general appearance. It's a hip-hugging, nine-pound, general purpose MS DOS machine with an 80 column by 16 line LCD screen, serial and parallel ports, modem, full-sized keyboard, room for 512KB of RAM and either one or two 5¼-inch disk drives built in.

You can grab the disks right out of the mouth of your PC just before you leave for the airport and stuff them into the Pivot as soon as you're airborne and the "Fasten Seat Belts" sign goes off. The built-in Pivot software consists of simple aids like a world time zone clock and a calculator; you have to supply the applications programs. Depending on how much IBM PC software you own already, this may or may not be a consideration for you.

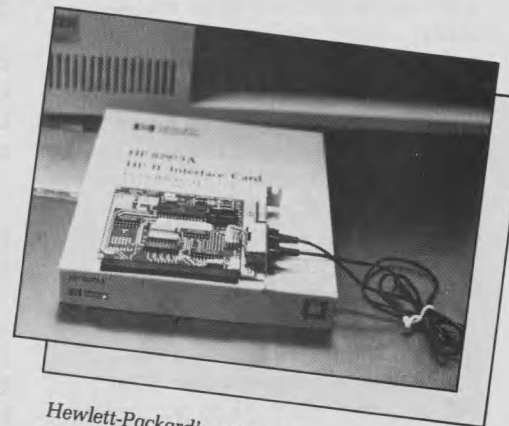
But there's no guarantee that all PC software will run on Pivot. Pivot's price with one disk drive and 128KB of RAM is \$2500. It should become available about the time this article reaches print. If Morrow can open distribution channels for Pivot, it could become an important and practical portable system. Morrow is at 600 McCormick St., San Leandro, CA 94577.

### Sord

If you want kneetop capability at a bargain price, then you'll be interested in the product a Japanese company, Sord, demonstrated at Comdex. The Sord IS-11 uses an eight-bit Z80 processor, but the internal spreadsheet, data management and word processing software Sord provides in ROM has the ability to exchange data files with other machines running 1-2-3, dBase II and WordStar. The IS-11 has a screen that can display eight lines with 40 characters on each line. It comes with a microcassette recorder for data and program file storage, parallel and serial ports, a 78-key keyboard, a bar-code-reader port and an internal modem. The unit



*Hewlett-Packard kept a large Comdex display room filled with people taking a short class on the use of the HP-110.*



*Hewlett-Packard's aggressive new attitude is demonstrated in its HP-110 to IBM PC interface board. It slips into the PC and provides full file sharing with the HP-110 portable.*

has 64KB of ROM and 32KB of RAM standard and another 32KB of RAM can be added. This all comes in a notebook-sized, four pound, six ounce box that sells for \$995.

The Sord represents the next generation of kneetop notebook machines modeled after the Epson HX-20 and Radio Shack Model 100. The screen is basically the same size as the one in the Model 100, but the total system has much more functionality because of the internal cassette storage and strong software that comes bundled with the machine.

I don't know where you can buy the Sord IS-11 (they were looking



for dealers), but if you can find it, you'll get a machine that provides a lot of capability in a small size for a reasonable price. Contact Sord Computer of America Inc., 723 W. 7th St., Los Angeles, CA 90017.

### Local Networks Gain Momentum

Corporate data managers have learned that the microcomputer user who claims to want to do only stand-alone work without sharing files probably has not really thought about the problem. People working with computers in offices and in industry always seem to need to share data and expensive peripherals, such as printers and large hard disk drives. Several companies announced or displayed networking products at Comdex that demonstrate how local networks have matured.

#### Quadram's Quadnets

Quadram Corp. seems dedicated to providing every product you could possibly squeeze into your PC. Its latest attempts to occupy the expansion slots of your IBM include three different versions of local area network hardware that can be used with its integrated software. It's a sign of both the progress the industry has made in networking systems and the aggressiveness of Quadram that it can market network products aimed at three distinct technical levels of network users. Since all of the network products use the same operating commands, you can modify your system for higher speed and more technical features without having to retrain everyone who uses the net.

The Quadnet family starts with a low-range network system that can connect up to 32 PCs using twisted paired wire on a network operating at about 300 kilobits per second. This product is called Quadnet II, and the master (file server) hardware and software kit costs \$995.



*The Morrow Pivot is a portable with a high-degree of IBM PC compatibility and one or two internal battery-operated disk drives.*

Each station on the network costs \$395 to install.

These prices make the Quadnet II one of the least expensive networks on a per-station basis that you can buy. Some estimates now put the cost of running coaxial cable in a commercial building at \$4 per foot and about \$47 per connection. Believe me, the amount of cable you use to neatly hook together a few terminals on a few floors can be surprising. If you can run less expensive pair, or even use existing telephone cable, then the cost of installing a local network will drop dramatically.

The only drawback to this system is that the network operates on a polling scheme in which the master interrogates each station on the net. This system is fair to all users and works reliably, but it adds some overhead to the network and limits



*The Sord IS-11 is a true kneetop machine that comes bundled with a full complement of software at a reasonable price.*

its theoretical top-end performance.

In practice, if you have one or even two dozen users who are mainly interested in sharing electronic mail and exchanging some files, this kind of network is a bargain for you. If your users typically compile a lot of programs, print a lot of documents through the central file server or all work on one large data file, they might find that they have slow responses on this kind of system. If this is the case, you have to move up the family line.

The next step in the Quadnet family is Quadnet VI. Quadnet VI uses baseband coaxial cable configured in a ring network that can be up to a mile in length. The access scheme is the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol pioneered by Xerox. This network operates at data rates of about two megabits per second. It can handle as many stations as you can physically and practically get onto the cable (the theoretical maximum is 255 stations). The Quadnet VI master kit retails for \$1995 and each network user kit is \$595. The master station can be used as a network station at the same time it's serving other users.

This kind of network can usually meet the needs of anyone planning an office automation system. The stations on the system can be quite active without degrading the response time of the network. But some of us might have requirements where many stations have to frequently access a large central data file (any of you planning an airline reservation system run on PCs?). This kind of active I/O environment can benefit from something more than CSMA/CD at two megabits per second.

The third Quadram offering is a token ring system (similar to the technology everyone anticipates IBM will eventually endorse) that allows data movement at ten megabits per second. The token passing method of network access is sure and reliable. It isn't as practical as other methods, such as CSMA/CD





### Rainbow Quest for the Color Computer

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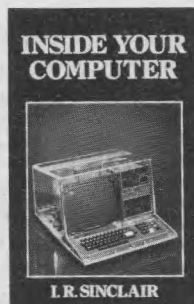
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Convert programs to run on your T/S 1000 or 1500. This is a guide to translating from other BASICs into Sinclair BASIC. Fifteen types of instructions are covered. The T/S replacement is given for each, followed by a description of its use and an example. Much of the material applies to the T/S 2068. **\$14.95 BK7396 206 pp.**



### Introduction to TRS-80 Data Files

Learn by doing with this guide to writing a data base manager. This book, with its accompanying software, takes you through a simple, mailing list program to teach you about sequential and then random access files. The construction of a DBM and the techniques for moving data to and from disks are discussed. **Book and TRS-80 disk \$24.97 BK7398 approx. 144 pp.**



### Inside Your Computer

Find out what goes on inside your machine. Inside Your Computer explains microcomputer circuits and how they work. Topics include chips, interpreters, circuits, machine language, binary numbers, algorithms, ASCII code, software, and what they all mean to the computer. Includes many photographs and schematics. **\$12.97 BK7390 108 pp.**

### TEXTEDIT

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by  
Irwin Bappaport

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### TEXTEDIT

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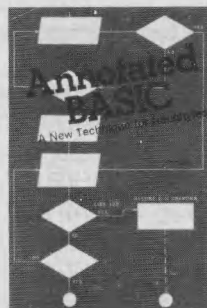
### Computer Carnival

For the TRS-80 Models I and III. These sixty programs for beginners will entertain and educate. Children will find mazes, word games, graphics, puzzles, and quizzes. Card games, logic tests, word and number quizzes, and letter guesses make Computer Carnival a learning experience. The Carnival Companion cassette of all sixty programs is also available. **Computer Carnival and Carnival Companion \$24.97 CC7389 Computer Carnival \$16.97 BK7389 218 pp. Carnival Companion \$9.97 TP7389**



### TRS-80 as a Controller

Learn to control outside devices with a TRS-80. This book is an introduction to interfacing, with simple, inexpensive projects. Applications include controlling lights and switches, building a small computer, and suggestions for more complex applications. The book applies to the Model III and, with minor conversions, the Model I. **\$12.97 BK7394 192 pp.**



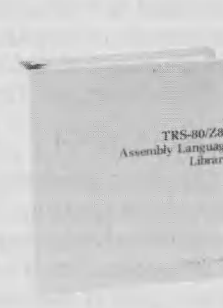
### Annotated BASIC, vols. 1 and 2

This two-volume set teaches you the hows and whys of BASIC programming. TRS-80 Level II programs are taken apart and described in detail. Each program is accompanied by documentation, program annotation, BASIC concepts and definitions, and a flowchart. **Vol. 1 \$10.95 BK7384 160 pp. Vol. 2 \$10.95 BK7385 125 pp.**



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for small data messages, but if the stations on your network have a lot to say to each other and they want to say it quickly, token passing becomes practical. The Quadram token passing ring system is called Quadnet IX. The system server kit costs \$2295, and a kit for each station on the network is \$795.

One challenge Quadram will face is finding retail dealers knowledgeable enough to sell, install and service these local area network products. It'll be interesting to see if the retail stores will step up to the challenge of providing a full range of support to meet the needs of their customers. Quadram seems to be ready to do its part. At Comdex it demonstrated an interactive program dealers can use to assess the communications needs of its customers and select the right network to meet those needs.

If you want to know which dealers near you carry Quadnet, contact Quadram at 4355 International Blvd., Norcross, GA 30093.

### Fox Research 10Net

The Quadram products are aggressive and impressive. Another company that always impresses me is Fox Research. Yes, it's affiliated with the company that makes the radar detectors. But in the computer world it markets an excellent database management system called 10Base and a powerful but economical local area network system called 10Net. 10Net uses twisted pair wires to connect the stations, so it has the advantage of low initial installation cost. Also, it's configured as a true "shared resources" network. This phrase means that no single unit is the master or file server. Any station on the network can share the disk drives or printer of any other station, if those facilities are designated for network use.

Each 10Net station package carries a \$695 retail price tag. The package includes not only the software to allow the communications and hardware sharing, but it also includes many network programs that

normally are extra cost items. The 10Net package includes software for electronic mail, an electronic bulletin board, an on-line calendar and a "CB-style" conferencing system.

Additionally, the 10Net software performs the vital job of record and file locking so that more than one station can access a file at the same time. As I'll discuss a little further on, almost all other networks leave this task to the applications software.

If you're interested in 10Net or the 10Base database management system (it's a true multi-user DBMS when you run it on 10Net), contact Fox Research at 7005 Corporate Way, Dayton, OH 45459 or call them toll free at 800-358-1010.

### Local Networks—Many Play

Other good local network products at Comdex were shown by 3Com, Novell and Orchid Technologies.

3Com aggressively leads the pack in providing reliable operation using the Ethernet standard. In fact, 3Com and Xerox have agreed to work together to develop and market local area network products. This agreement goes back to the fact that Bob Metcalf, one of the key developers of Ethernet at Xerox, is now the president of 3Com.

Novell is adopting a unique marketing position in that it sells its own network hardware and software, but it's also actively selling its software to other vendors who can use it under their own names with their own hardware. Obviously, Novell wins however a sale is made, and this approach is also putting the company in the driver's seat during attempts to standardize certain features of general network software for the IBM PC.

Orchid Technologies has helped those of us with little space left in our PCs by offering networking boards with other expansion features, such as added memory and I/O ports.

All of these products show a trend

toward maturation in the microcomputer local network market. But there are still many pieces missing before a market evolves that meets everyone's needs. First, these networks don't help the person like me who has microcomputers using three different operating systems. Second, they have almost no provision for entering the network through an RS-232C device such as a modem or dumb terminal. Third, while they provide the conduit to allow network stations with the same operating system to pass communications and they really do allow you to share data and program files, in every case but 10Net, the file and record lockout management needed to keep multiple users from clobbering each other's files must be provided by the application software. This means that we need language compilers, spreadsheets, database managers and accounting software designed for multiple users. This kind of software has been slow to become available (chicken or the egg?) and costs for these programs have often been too high. This condition is changing, but slowly.

### Hope from Digital Research?

By the way, I haven't seen it run, but Digital Research Corp. (the CP/M company) is promoting a multi-user system called StarLink that seems to be able to allow eight-bit and 16-bit microcomputers to work together in a network by virtue of Digital Research's Concurrent DOS. An IBM PC running Concurrent DOS and the StarLink software serves as the host for the network. Call Digital Research toll free at 800-227-1617, extension 400 (800-772-3545, extension 400 in CA) for more information.

### Battling Toe to Toe

One of the sideshows at Comdex was the literal toe-to-toe battle of the display booths waged between Lotus and Ashton-Tate. The large



display areas of both companies were located just across a narrow aisle from each other. Each booth had multiple display stands set up where company employees demonstrated software. The Lotus people were putting Symphony through its paces while the Ashton-Tate crowd demonstrated Framework. Each of these programs combines spreadsheet, database, word processing, communications and graphics together into one integrated package. Ashton-Tate is trying to take on Lotus and win an upset in the integrated software market.

If the demonstrations were any indication, Lotus's employees and product are ready for the fight. I wasn't so sure about the Ashton-Tate army. The troops under the Lotus banner were smart and disciplined. They knew the product and they weren't afraid to show the people gathered around everything they wanted to see. The Ashton-Tate people sometimes gave demonstrations and sometimes just stood around talking among themselves. Each person seemed to know something about a portion of the program, but you had to bounce between people to get a full picture.

Perhaps it was an artifact of the displays, but the programs seemed to have the same qualities as the demonstrations. I perceived Symphony to be slick and well-integrated. Framework had some areas that were clearly patched together. The total impression was that it would be a good battle, but that Ashton-Tate has work to do before it can win the war.

### The Polar Bear Growls

If display size and number of employees at Comdex indicate marketing intent, AT&T is out to win big. Like Hewlett-Packard, AT&T leased a separate huge display room and filled it with equipment. But they also filled it with some of the best and brightest sales people at the show. Every time I went into the AT&T area, it was packed, but there

was always someone there to meet me personally and take me around. As I indicated in earlier columns, AT&T is now aiming directly at the market occupied by Digital Equipment Corp. The AT&T polar bear and the IBM grizzly bear are roaming separate ranges... so far.

### Accounting Packages

I don't have the space here for an in-depth review of accounting systems, but at Comdex, it was evident that accounting packages for microcomputers have now reached maturity. The "accounting" packages for microcomputers I reviewed a few years ago were little more than glorified checkbook-balancing programs.

Some of the first accounting packages marketed for the PC required that you substantially change the program code to make the software really usable. Nice features such as forecasting and report generation modules were missing. Now, many companies are ready to help you with complete integrated accounting packages that you can really use to run a prospering business.

Several companies seemed to stand out among the many demonstrating integrated accounting packages. First, Prentice-Hall, a publishing company that seems serious about marketing software, has a package called The Profit Center, featuring a menu-driven series of integrated packages. These packages all fit under one master menu and include general ledger, accounts receivable and payable, word processing and a special time and information manager. A neat feature is essentially an "electronic desk" that includes an appointment calendar, address and phone number book, checkbook register, time and charges log and other functions. Profit Center is initially being marketed for IBM PC and similar systems. Contact the General Publishing Division, Prentice-Hall, Englewood Cliffs, NJ 07632.

While Prentice-Hall's product is impressive because of its versatility and menu-driven approach, the accounting programs from RealWorld are impressive because of their proven track record. RealWorld accounting software has been quietly selling to major firms who use them on both mini- and microcomputers. The programs are available in versions that can be run with many different operating systems, including CP/M, CP/M-86, Turbo DOS, MS DOS and Unix.

The RealWorld packages include accounts receivable, order entry with inventory control, sales analysis, accounts payable, general ledger and payroll. All of the "big time" features are available in RealWorld programs, including password protection, passing information automatically between different modules, flexible selection and editing of data, and automatic backup and restore. Contact RealWorld Corp., Dover Road, Chichester, NH 03263.

Champion Business Accounting Software is another line that has developed a good track record. The interesting thing about this system is that it's written under Ashton-Tate's popular dBase II database management system. That means that if you're comfortable with dBase II, you might be very happy with this package. The Champion functions include general ledger with financial statements, accounts payable/purchase orders, inventory, payroll and accounts receivable. Contact Champion Software Corp. at 66 South Van Gordon, Suite 155, Lakewood, CO 80228.

These accounting products are only a few of those shown at Comdex. I picked them out only because they each were a little different. Many good accounting packages are available now; this has finally become a practical function for microcomputer systems.

See you next month here in "Overview." □

Contact the author at Box 691, Herndon, VA 22079.



# A> The System Prompt

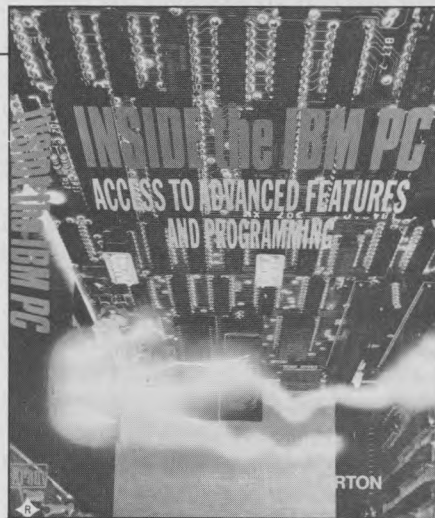
By Edward Joyce

## The Inside Dope On Your PC

## The Book(s) On IBM's Innards

Computers are smart, most of the time. They flaunt a high IQ when playing master-level chess or masquerading as psychotherapists in counseling sessions. But ask that same computer to explain its inner workings and the response you get, if any, falls along the lines of a terse, dumbfounded "Invalid Command." To learn about the engine within the machine, you have to put the conglomeration of silicon and iron aside and turn to Gutenberg's 500-year-old invention, the printed word.

Today, bookstores are brimming with books, guides and manuals designed to endow the curious with an understanding of those electronic brains called microcomputers. Many of these publications focus on the most popular computer of all time, the IBM PC. Particularly noteworthy in this crowd are two books that explore the mystery and magic behind the video display, dissect the circuitry gate by gate and otherwise delve into the internal nuts and bolts of the PC. Neither will replace IBM's \$36 *Technical Reference Manual*, but they do fill some gaps that can ease life in the programming lane. Let's take a closer look.



### Norton's Three Circles

In *Inside the IBM PC, Access to Advanced Features and Programming*, author Peter Norton imparts the wisdom that, according to the publisher, earns him the title of "the most widely read author on the IBM PC." PC aficionados will recognize writer Peter Norton as magazine columnist Peter Norton and programmer Peter Norton of *The Norton Utilities* fame. *Utilities* consistently rank in the top 30 best-selling

software products. In case you haven't come across the magazine advertisements touting the utilities, Norton wastes no time in mentioning them—he plugs the product on the third page of the book.

After other introductory passages of a less commercial bent, the author eases into the software and hardware logic that lurks behind the PC. Each chapter is prefaced by a reference to three circles of interest. The circles represent the overlapping territories of IBM PCs, PC clones (e.g., Columbia and Compaq) and computers that are MS DOS-compatible but are not PC clones (e.g., Tandy 2000 and Sanyo MBC). The author states to what degree the chapter covers the related circles of interest.

Naturally, all of the material applies to IBM's machine. Areas such as the video display generally extend to PC clones. Descriptions of DOS function services relate to all three circles. The circle approach sets the record straight on the issue of compatibility. This provides dual benefits. It lets you know what areas of the sacred IBM standard can be compromised with minimal impact on compatibility when writing a



program. And it gives you an idea of how a similar machine that shares the same hardware or operating system works internally.

The second chapter of the book skims over the PC's hardware components. The 8088 microprocessor, 8087 numeric coprocessor, 8284A clock generator, 8259A interrupt controller, 6845 CRT controller and NEC PD765 floppy disk controller warrant a scant 12 pages. The presentation is given from a high-level, functional view without pin-outs, timing diagrams or programming specifications. This is the closest the book comes to explaining hardware devices. Afterwards, the hardware is described as seen through the system software, in particular, the ROM, BIOS and DOS.

At this point, solder slingers and dyed-in-the-wool bit-bangers may be tempted to shelve the book because of the shallow hardware descriptions. If you're looking for the ultimate road map to the TTL circuitry, this book certainly isn't it. Still, the treatise deserves close perusal. The information density in sections describing some of the operating software rivals IBM's own literature.

### Dissecting Disk Anatomy

Perhaps the main strength of *Inside the IBM PC* surfaces in the section dedicated to the floppy disks. Norton explores the anatomy of the disk track by track. He first explains the "hidden files" that the ROM reads from the disk to bootstrap the system. These files extend the bare bones ROM into a full-blown BIOS with complete device drivers. The system routines that are in ROM are accessed through RAM interrupt vectors, which can be intercepted by the BIOS loaded from disk.

Allowing the ROM to be overruled by the BIOS conveniently facilitates maintenance. Instead of replacing an entire chip, you only have to replace a disk file to correct a ROM or operating system bug. Norton justifiably applauds IBM's wisdom in choosing this approach.

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### I worked my highlighter dry on the description of the video display—in one fell swoop, Norton puts many questions to rest.

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Detailed explanations of the interrupt services of the BIOS follow the bootstrap discussion. The eight services are covered one by one, succeeded by descriptions of the DOS functions. The descriptions range from comprehensive to cursory, but on the whole, they fall short of IBM's DOS manual.

The next chapter delves into the directory format and file allocation table (FAT), or what those who are not embarrassed about revealing their age call the volume table of contents (VTOC). This chapter also unveils the secrets of copy protecting floppy disks, that is, writing or formatting a disk so standard DOS utilities cannot copy it. In general, the chapter rates a gold star, but it could be improved by dropping the beginning paragraphs that harp on the age old refrain of... a floppy disk "is a circular piece of soft plastic covered with the familiar brown oxide coating common to all magnetic media, such as recording tape." Yawn. Is this the same book that calls itself an "advanced guide"?

The author rounds out the discussion of disks with a comparison of the three types of disk access, namely, through the low-level ROM/BIOS, the higher DOS services or the still higher programming language interface. The usual programming language operations found in Pascal or Basic satisfy most disk applications. The DOS services can streamline performance by reading

and writing blocks of data, up to 64KB. Access at the ROM/BIOS level can further speed up performance, but you sacrifice the DOS conveniences of performing error retries and monitoring head settling and motor starting times of the drive.

Besides the chapters describing the disk, another area where I nearly worked my highlighter dry was the description of the video display. In one fell swoop, Norton puts to rest many questions on the display that I've harbored for more time than I care to admit. He spells out color palettes, memory mapping, RGB monitors and other esoteric display topics that send your head spinning upon first encounter in the hardware reference manual. Sound advice accompanies the technical descriptions, too. For example, Norton warns the programmer against using cyan and white on the color monitor since they are least distinct and detract from the readability of screen displays.

### Inspecting Parsley

While the disk and video sections of the book supply the meat and potatoes of this inside picture of the PC, other parts flavor the meal with the blandness of stale parsley. Under the guise of learning how to inspect disk sectors, you learn that the original version of DOS 1.00 contained the name of Robert O'Rear in the boot file while in later versions it was changed to Microsoft. This tidbit may someday win a prize in a computer trivia contest, but it's of questionable value to the systems programmer hungry for raw information. I'd much rather see a comprehensive treatment of the I/O ports, which, incidentally, the book lacks.

Another shortcoming stems from the relative scarcity of illustrations and tables. Long stretches of prose flow from page to page broken only by section headings. A few visual aids would help immensely in digesting the heavy flavor of the technical material.



Those who want to learn intimate details on the latest PC configurations may be concerned about the scope of the book. The newer developments of the XT and DOS 2.00 are added in an appendix. The PCjr, announced after the book's publication, isn't referenced at all. On the bottom line, these omissions amount to little because the bulk of what the book says regarding the PC applies equally well to the PC's successors.

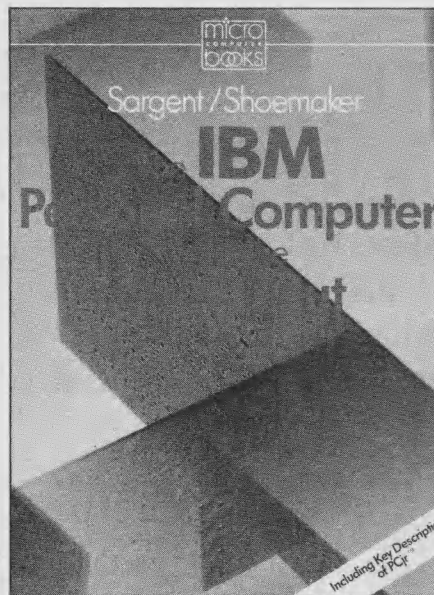
### Instruct Through Examples

In the areas Norton does cover, he writes clearly and in a semiconversational manner that keeps you attuned to the technical jargon inherent in this type of guide. To drive certain points home, he resorts to program examples written in Pascal, Basic or, occasionally, assembler. Choice examples are two programs that demonstrate the effect of interrupts by activating the speaker with and without interrupts disabled. In the first case, the speaker produces a steady, pure tone. In the interrupts enabled case, the speaker quivers due to the clock interrupts. Norton appropriately calls these programs Beep and Warble.

These types of programs ease the way for novices. Seasoned professionals also benefit since the code dispels any uncertainties in the text by showing precisely how to interface to low-level software and hardware.

The author goes one step further with the program examples by providing three demonstration disks to accompany the book. The disk package costs an extra \$60 and includes more than 100 programs. Among the programs are a copy protection scheme, sound experiments, port explorations and the DiskLook utility, which completely maps out a directory and lets you probe the disk with surgical precision.

The disk package is purely optional, not at all necessary for understanding the text material. It would come in handy, though, for software jocks who want to incorporate the code, such as the copy protection



scheme, into other programs. Norton permits this type of use in the license agreement.

Overall, Norton has combined material from diverse sources together with, in his own words, "experimentation and savvy" to produce a valuable PC resource. It won't displace IBM's own documentation. But couple it with the *Technical Reference Manual*, and you'll have one of the best libraries of PC information available.

### Unveiling the Hardware

Although Murray Sargent's and Richard Shoemaker's *The IBM Personal Computer from the Inside Out* resembles Peter Norton's text on the title page, the books diverge rapidly from that point. While Norton devotes the bulk of his material to interfacing to the ROM, BIOS and DOS software, Sargent and Shoemaker dip deeper into the hardware and focus on a variety of other topics. Paramount among these is the 8088 assembly language, which the authors spend nearly 200 pages explaining.

The orientation of this guide to PC power is best understood by examining the authors' backgrounds. Both teach optical sciences at the University of Arizona. Their PC book is used in a one-semester graduate-level course on microcom-

puter interfacing. Previously, they've written numerous books and papers on laser applications and published another hardware cookbook entitled *Interfacing Microcomputers to the Real World*.

The academic setting explains the book's heavy tutorial flavor. The handholding will be relished by the novice, but experts fluent in machine architecture will be bored by the primers on binary numbers, gates and flip-flops.

From the outset, the book takes a tack of spoon-feeding general concepts of programming and digital design and then applying these to the IBM PC and PCjr. A pattern results in which many topics are touched by the scatter shot, but few subjects, with the exception of certain hardware devices, are hit solidly. This strategy may work well in the classroom for conveying general lessons on microcomputer interfaces à la the IBM PC. Programmers who are eager to explore the deepest recesses of logic behind the PC's A> prompt will be disappointed in the shallow presentation of the system software.

The PC is complicated enough to warrant a complete book dedicated to its internals. Sargent and Shoemaker's book falls short in that it tries to squeeze in too many related areas. The assembly language tutorial, for example, spans three chapters. Still, it's inadequate because the 8088 instruction set is never completely listed, not even in an appendix. The 8088 and the assembler would be best left to other references such as *The 8086/8088 Primer* by Stephen Morse and *Assembly Language Programming for the IBM Personal Computer* by D.J. Bradley.

The conclusion of the assembly tutorial does pique your interest with a discussion of the 8087 numeric coprocessor. Although I've never had to program it, detailed information on the 8087 seems to be about as scarce as source listings for the microcode of nuclear cruise missiles. The authors delve into the



seven types of numbers handled by the 8087 and provide valuable programming tips, including a routine that calculates the radius of a circle.

### Fundamentals

The next chapter surfaces from the depths of the PC to introduce digital circuitry, starting with diodes and transistors, moving through flip-flops and counters and concluding with multiplexers and demultiplexers. Hardware aces will break speed-reading records leafing through this material, but novices and software jocks may welcome the opportunity to learn circuit fundamentals.

The "Inner Workings" chapter follows the digital introduction, and it's here you learn how the silicon and iron components unite to exhibit machine intelligence. The authors leave no chip unturned on the PC and PCjr system boards. The text lucidly explains the plethora of circuits with illustrations of pin configurations, timing diagrams and I/O port addresses.

If you've ever wondered how the PC ties together the signals throbbing from the 8088 microprocessor, 8259 interrupt controller, 8237 DMA controller, 8253 counter/timer circuit, 8255 PIO, ROM and RAM, then this is the place to look. Developers of add-on boards for the PC or PCjr could justify the cost of the book with this section alone.

The high quality of the system board presentation extends to succeeding chapters, which focus on interrupts, the keyboard, video display and data communications. As in other sections of the book, assembly language examples punctuate the discussion of interrupts. The authors demystify interrupt applications, including the keyboard type-ahead buffer, dedicated polling and multitasking.

The keyboard and video display sections continue the thoroughness and clarity. Considering the confusion revolving around the mono-

chrome adapter, color/graphics adapter and myriad display modes, you can never have too much information on the video screen. Besides IBM's standard interfaces, the Hercules Graphics Card is also described.

The chapter on data communications may salvage the book in the eyes of many software jocks who regret the overall absence of intimate details for plugging into low-level system routines. The Centronics parallel and 8250 UART serial ports are turned inside out. You learn about handshaking conventions, pin functions, programming considerations and modem transmissions. The inside picture helps to unmask the black box that seems to perpetually surround data communications. Discussions of fiber optics, radio waves and infrared carriers tidy up the chapter.

### Cliches

In one of the final chapters of the book, the authors revert to the day-one-computer-user tutorials that made me double check the cover to see if I had inadvertently picked up the *Sesame Street Guide to Computers*. They rubber-stamp the cliché. . . "[the disk] coating is the familiar brown layer of metal oxide particles used on magnetic tapes for tape recorders." (I wish I held the copyright to that statement. It must appear in every computer book printed for the past decade.) Anyone who doesn't know what a disk is would only be reading an advanced guide to the PC as a cure for insomnia.

The discussion goes downhill from there with an essay on editors that begins with: "An editor is a program that allows you to create, modify, store and retrieve text files." On DOS: "To develop software, run programs or write papers, you need a disk operating system." I was tempted to ask my local book merchant if I could cut these pages out and return them for a refund.

Some gems of wisdom do manage to emerge, though, from beneath the beginner's lessons. In the first pub-

lished account I've seen, the authors cite the origin of the name of Winchester hard disk technology. "The name comes from the fact that one of the earliest such devices had dual 30-megabyte disk platters. This reminded people of the Winchester 30-30 rifle—hence the name."

They also offer the axiom, "every year things get better, so if you wait to buy your computer equipment until you die, it'll be fantastic!" I'll definitely spring that one on friends and relatives who ask on virtually a daily basis whether they should invest in a computer now or wait until next month.

All in all, Sargent and Shoemaker's book exposes the PC in several key areas. The work is saddled with elementary lessons that seasoned veterans will have to wade through. On the other hand, the handholding will attract novices and students, especially in teaching environments where the PC is a workbench for hardware instruction.

By no means will it supplant IBM's *Technical Reference Manual*. But if you're planning a serious excursion into the jungle of logic beyond DOS's command line, then check it out. It could be just the paddle you need to avoid being stranded up the proverbial creek. □

*Inside the IBM PC, Access to Advanced Features and Programming*  
Peter Norton  
Robert J. Brady Co., 1983  
Rtes. 450 & 197  
Bowie, MD 20715  
Softcover, 305 pp., \$19.95  
\$79.95 with three disks.

*The IBM Personal Computer from The Inside Out*  
Murray Sargent and Richard Shoemaker  
Addison-Wesley Publishing Co., 1984  
Reading, MA 01867  
Softcover, 483 pp., \$16.95.

Address correspondence to Edward Joyce,  
Route 9, Box 149, Charlottesville, VA 22901.



# The Database Manager

By Shawn Bryan

## Two Orwellian Thought Processors

### Is It a Word Processor Or a Database?

This month I'll review two Orwellian-sounding products called thought processors. ThinkTank and Thor are both interesting programs that walk the line between word processor and database. Also Nutshell, a new product from Leading Edge, is reviewed, and KeepIT, CalcIT and WritIT are evaluated for their integrating powers.

ThinkTank and Thor make a fascinating study in contrasts. ThinkTank is a thought formatter while Thor is a free-form thought capturer.

#### ThinkTank

ThinkTank is an outline processor that makes the process of organizing your thoughts into outline form less terrifying. I've never liked using outlines. In my high school and college days, I dreaded the inevitable command, "Do an outline for the next class."

Unfortunately, my chosen fields of study (English and philosophy) required many papers and many outlines. It was too much work to try to write a decent outline. That meant lots of time and effort spent planning a paper and many revisions

of the outline. Since erasures weren't tolerated, it also meant many hours typing and retyping. That, in my young opinion, was a waste of my valuable time.

#### It's a Snap

ThinkTank's flawless execution makes creating an outline a snap. If you've ever had a brainstorming session, ThinkTank is the ideal way to record those thoughts that bubble to the surface and, if not immediately caught, quickly disappear.

You begin ThinkTank (Tank for short) with an empty screen. By pressing the insert key (on the IBM), you enter the outline mode. It's here that the outline first starts to take shape. Type in your headings or thoughts as they occur to you. Don't worry about order, just get the information down before you forget it. If you have a thought or heading that leads naturally to a number of subheadings, a press of the right arrow key indents the subsequent material. When you've finished typing in the subordinate material, a press of the left arrow key brings you back out to the left margin again.

The key is to not worry about form now. It's easy to move things around later when the mental fires have cooled a little. In fact, ThinkTank almost encourages you to reorganize your outline.

After you enter the information, you can use the F1 key to mark an item for movement and drag it around to where you want it. A press of the F1 key puts it there. This is just the beginning, however.

#### Many Moves

Remember how your school outlines had to be indented and have lots of subheadings? ThinkTank not only lets you indent the items, but it collapses and expands headings to make the subheadings disappear and reappear. If you have a screen full of subheadings and you want to work on some other part of your outline, you can collapse all the subheads into the heading. The clutter is gone until you need the detail again.

Tank uses the decimal numbering system for your outline, and it assigns numbers to your outline headings and subheadings automatically (up to 10,000).



Pages of text (20,000 characters or 900 lines) can be entered under each heading when the framework has been organized to your satisfaction. This text is attached to the heading above it and can also be collapsed. The text will follow the heading if you decide it fits better elsewhere. When you're ready to turn the various paragraphs into a finished product, Tank has a merge function that allows you to put the outline together into larger chunks for porting to your word processor for a final edit and printing.

Tank supports two types of file transfer: formatted and word processor. The formatted file is an

ASCII file that contains the text in the same format as you see it on the screen; that is, in outline form. The word processor file is an ASCII file that can be read by most word processing programs and contains your text in normal paragraph form. Either way, you can get your text to your word processor for final printing with a minimum of fuss.

How is this program a data manager? Technically, it's more of a word processor than a database manager. You can enter a search mode that permits you to find text you've entered. This is the search-and-replace and search mode that most word processors have.

You can use Tank to store thoughts and ideas for later retrieval. Tank also allows you to sort your thoughts and ideas into alphabetical order. If a database manager or file manager is used to store information for later retrieval, then Tank qualifies, since capturing and retrieving thoughts with ThinkTank is much easier than with a simple word processor.

### Thor

Thor is the opposite of ThinkTank. Thor is a free-form database in which every word is retrievable. It's much like a word processor in that you're given an empty screen

## Evaluations: One Man's Opinion

I have a growing concern about the way in which software in general is evaluated.

To help you understand the review process I use, let me share it with you. I'm constantly seeking to improve my evaluation process, but here, in a nutshell, is my existing *modus operandi*.

No package I receive for review comes with any strings attached. I get software directly from manufacturers, I purchase it or I get review copies from *Microcomputing*. I first review the written material. Does the manual tell me what I need to know to get started, and does it do so clearly? Then I study the advertisements to see how the ad claims compare to what the manual says. Is there truth in advertising?

The next step is to make backups and try to get the program going. Does the program lead me along? Does it crash gracefully when I goof? If it doesn't tell me what to do next, can I figure it out on my own?

Once the program is running, I use a series of files I've built up over the years as test files for the importing and exporting of data.

This saves me a lot of typing and allows me to test the import and export facility. Will the program talk to others or not?

I also build a small database from scratch to see how long I fumble along before getting it right. I often ignore the manual to see if the program is forgiving enough and helpful enough to let me find my own way. In my experience, most managers using a database read only as much of the manual as is absolutely necessary to get started. From there on out, they try to fly on their own. Does the program help you fly, or does it shoot you down in flames?

I am most concerned about integrity of data and graceful exits. If I manage to crash the program, do I lose data? Are files left open? Do I get a message telling me what's happening or does the system just disappear? All these things are important to me and should be important to you when you start looking at database managers.

In the coming months, I'll be experimenting with various analysis methods to make software testing as scientific as possible. The purpose of all this is to give you the

best, most objective evaluation of database software that I can.

When all is said and done, however, I'm still offering my own opinions. Software takes on the personality of those who write it so I'll try to talk about the personality the software exhibits as well as time trials and other measurable quantities. I'll write about that part of the program I call personality, but I'll try to make it clear when I'm doing so. That way you'll know that what I'm saying is my opinion, not an objective evaluation.

Now that you know how the process works, you're in a better position to evaluate the evaluations.

One last remark: truth in reviewing (much like truth in advertising, but better) also mandates that I inform you that I have no affiliation with any software firm. I own no computer stock; indeed, I own no stock at all. I'm not a programmer *per se*, and I don't work for any software or hardware firms. My profession has been, and continues to be, in both the private and public sectors, financial and information management. S.B.



State-of-Mind screen. You can establish the criteria by which Thor will find any thoughts categorized that way.

indexes. All you have to do is put the information into Thor, and Thor will help you retrieve it.

## A Real Team

Couple Thor with Tank and you have a real team. Use Thor to capture random information that must later be collected and sorted into some sort of order. Then use Tank to organize that information into a presentation or speech or campaign—whatever is appropriate. The two together make a marvelous productivity enhancement team. If you need this type of organization in your life, I recommend both ThinkTank and Thor. When Thor has written documentation, I'll recommend it even more highly. Fastware is working on that now, and I expect that a manual to accompany the help screens will soon be available.

As a footnote to Thor, I called Fastware and spoke with Paul Spreen, one of the partners in the company. He told me that Thor is written in Fastware's own development language. Fastware will be marketing a more conventional database development system in this language in the future. When it's available, I'll receive a review copy and let you know how well it works.

## KeepIT, WritIT, CalcIT

I received KeepIT, WritIT and CalcIT the other day and played with them a little. I have to admit that I haven't been particularly fond of this type of integration in the past. There are just too many disks and too many commands to remember.

The advantage of integrating software by making sure different software packages can talk to one another is that you don't have to make sacrifices in one package to get all the other stuff in. Most of the integrated software now available that comes on one or two disks makes sacrifices somewhere

Thor master menu. This screen graphically depicts the IBM PC function key pad.

upon which to type. The editing functions are much like those of a word processor, too. But the information is stored in a large field in a file rather than as a page of text. You can retrieve each word in the file. You can also categorize your files and enter information about their content. This procedure speeds the retrieval process because the categories and content descriptions are indexed for rapid access.

## Marvelous Engineering

The editor in Thor is a marvelous piece of engineering. If you have a color monitor, typing with Thor can be a rewarding artistic experience. Text can be typed in various colors and intensities. The extended IBM character set is available so you can draw around important points if color isn't enough. Retrieving data is a snap since anything you can remember can be found.

An ideal application for Thor would be as a daily log, either for

the telephone or for some other activity where random information needs to be recorded and where recall is important. Each phone call can be recorded in Thor and later retrieved by date or name.

This database is fun to use because the rules are so loose—just about anything goes. Using Thor as a desktop calendar would also be a good application. Simply leave Thor up in a window on your multitasking PC and jot down notes of your meetings, expenses, thoughts and telephone calls. As one disk fills up, start another. By year's end you may have a few disks filled up, but you'll also have instant recall of every meeting with Jones and every long distance call to Smith.

You'll also be able to pull out the justification for a peculiar expense item when the IRS asks you about it. Whatever you put into Thor, you'll probably be able to get back out. That's the secret to its success—it catalogs everything. You don't have to worry about fields or



simply because there isn't room for all that code.

## Problems Solved

Separate packages, like the IT series, solve the problem by making the best software available and simply making sure that it talks to the other software in the series. I'm starting to believe that the hassle of extra disks and program manuals may be worth the effort. You don't have to put up with compromises when you use this type of integration.

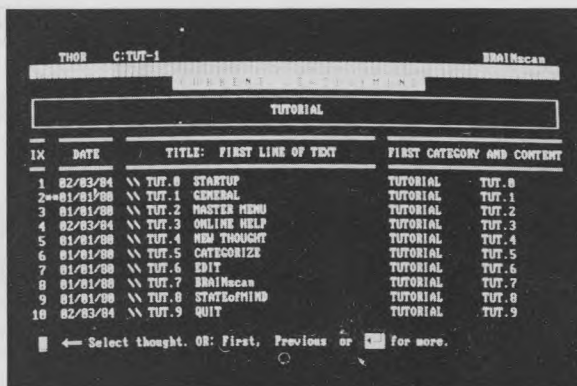
You and I have known this all along. It's exactly what we do when we tie our spreadsheet, our database and our word processor together. Martin Marietta has simply done the work of making the interface consistent and making sure there really is some compatibility between packages.

Before I get to KeepIT, the data manager, let me tell you about WritIT and CalcIT. WritIT is MultiMate in disguise. MultiMate is one of the best-selling word processors around. It looks and acts like a Wang. It has lots of nice features and is my personal favorite.

Unfortunately, it isn't particularly friendly towards other software. The ASCII file conversion utility provided with WritIT is the only way you can get text files into the program. This utility works reasonably well, but you end up taking out a lot of carriage returns when you transfer a file.

Also, the mail merge facility in WritIT leaves a lot to be desired. It requires a fair amount of repetitive typing. That task is made easier by the macro command files you can create, but it's still an awkward implementation. Fortunately, KeepIT has an interface to WritIT. As a result, your days of typing those mail merge files are over. KeepIT will put your merge file together for you, ready to go.

The CalcIT program is a nifty 3-D spreadsheet originally put out by Datamension. The spreadsheet uses full color if you have it. It also



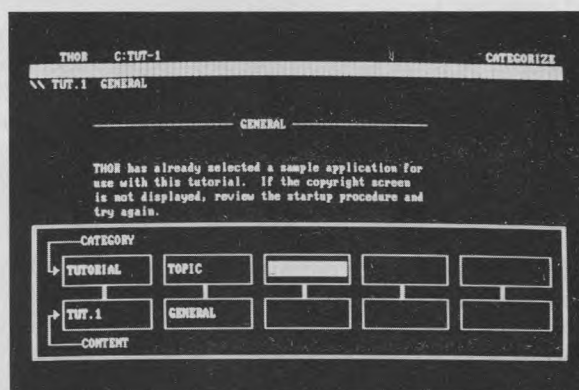
THOR C:TUT-1 BRAINScan

IX	DATE	TITLE: FIRST LINE OF TEXT	FIRST CATEGORY AND CONTENT
1	02/03/84	TUT.0 STARTUP	TUTORIAL TUT.0
2	01/01/80	TUT.1 GENERAL	TUTORIAL TUT.1
3	01/01/80	TUT.2 MASTER MENU	TUTORIAL TUT.2
4	02/03/84	TUT.3 ONLINE HELP	TUTORIAL TUT.3
5	01/01/80	TUT.4 NEW THOUGHT	TUTORIAL TUT.4
6	01/01/80	TUT.5 CATEGORIZE	TUTORIAL TUT.5
7	01/01/80	TUT.6 EDIT	TUTORIAL TUT.6
8	01/01/80	TUT.7 BRAINScan	TUTORIAL TUT.7
9	01/01/80	TUT.8 STATEOFMIND	TUTORIAL TUT.8
10	02/03/84	TUT.9 QUIT	TUTORIAL TUT.9

← Select thought. OR: First, Previous or for more.

BrainScan screen. Thor searches the database for thoughts matching the criteria established in State-of-Mind.

The Categorize split screen shows current thought plus method for defining categories and their contents.



THOR C:TUT-1 CATEGORIZE

← TUT.1 GENERAL

GENERAL

THOR has already selected a sample application for use with this tutorial. If the copyright screen is not displayed, review the startup procedure and try again.

CATEGORY	TUTORIAL	TOPIC			
TUT.1	GENERAL				
CONTENT					

likes KeepIT fairly well. There's a special interface utility provided that makes the transfer of data from KeepIT to CalcIT almost easy. It's all menu-driven. Some of the transfer process is a little obtuse (including the documentation), but it's still better than transferring DIF files or print files.

## Data Cube Idea

The slickest thing about CalcIT is the 3-D, or data cube, idea behind the spreadsheet. Think of a normal spreadsheet with rows and columns. Then add pages, or depth, to the spreadsheet and you have CalcIT.

It takes a little getting used to, but I can see many advantages to the pages available in this spreadsheet. CalcIT also has an interesting graphics capability built into the spreadsheet. It uses the IBM's extended character set to create the graphics images. As a result, the graphs appear as clear and precise images. The facility may not be as easy to use as 1-2-3's, but some

very passable charts can be created.

Charts can be printed directly from the spreadsheet on supported printers, unlike 1-2-3, which uses the Printgraph facility to get charts to paper. Clearly, 1-2-3 has a more sophisticated function for graphics, but CalcIT works better with WritIT and KeepIT for data transfer.

## And Now...

Now for KeepIT. Here is a menu-driven, compiled Basic database manager. It's clearly designed for the novice who has little or no need to learn computers. Menus lead you every step of the way.

Database specification is done in a menu that asks you to fill in the blanks for your database. You define the prompt that's to appear, the field name, the page number, row number, column number, type of field, the maximum length of the field, the lower and upper limits, if any input specifications are to be supplied, the format for display of numeric data and, finally,



any formula to be applied in evaluating the input specification. If you don't want to specify your fields in this manner, KeepIT allows you to use the forms painting techniques favored by many. You can have up to nine pages of input forms for each database.

## Standard Functions

The database functions of KnowIT are standard for this type of program. Reports can be created from two files if a link has been established. Various report formatting options make the creation of tailor-made reports a snap. In addition to standard printed reports, tabular reports are possible.

If you're familiar with the statistical function cross tab, you'll understand this function easily. One- and two-way tabs are permitted. Cross tabs are essentially a way of listing the occurrences of a value or item in table format. You may also request a statistical report for a field in your file. KnowIT will compute the total, average, standard deviation, and the minimum and maximum values for all the selected fields in the file that match the selection criteria.

If you use WritIT or MultiMate, KeepIT will also put a file out that can be read directly by those word processors. No conversion from ASCII to WritIT or MultiMate format is required. KeepIT can also output mail merge files compatible with WritIT and many other word processors. Those directly supported include WordStar, Edix/Wordix, Spellbinder/Eaglewriter, WordPlus, WordPerfect, PeachText and EasyWriter II. This impressive list of compatible formats makes KeepIT an especially good choice if you need compatibility between your word processor and the file management system.

KeepIT will also interface with most spreadsheet programs. It has DIF or SYLK file formats as options for file output.

The specification table for KeepIT (Table 1) gives the down

Characters per field	70
Fields per record	99
Records per file	32,767
Characters per record	2,400
Data entry screen	Up to 9
Number of keyed fields	3
Password protection?	Yes
Command files?	Yes
Files open at once	Two files may be linked for simultaneous access.

Table 1. KeepIT Statistics

and dirty numbers about the program. What it doesn't tell you is that KeepIT is ideal for the novice computerist and for people who want integration without compromise or effort on their part. If you don't want to be bothered with menus, this program isn't for you. If you really want to get your work done, and if you really want a program that will work with as many other programs as possible, then KeepIT may be a good choice.

## Nutshell

Leading Edge Products of Norwood, MA, has released the final version of Nutshell. The final documentation is hot off the press and the program looks fascinating. You remember last month I listed some impressive statistics about the program (things like 16 million characters per field and two billion records per database). I'm pleased to announce that the hype is backed up by what appears to be an easy-to-use, quality product.

The people at Concentric Data Systems were the first to seize upon a truly visual program for the 16-bit machines. Leading Edge has joined the fray and added a few bells and whistles to distinguish itself from the masses. The filing cabinet that greets you when you start the program is the first indication that something different is going on here. When you select a file, the cabinet drawer opens to show the files, and, before you

know it, there you are, in the database. It may not be a functional piece of programming, but you have to admit the entrance does catch your attention.

## Setting It Up

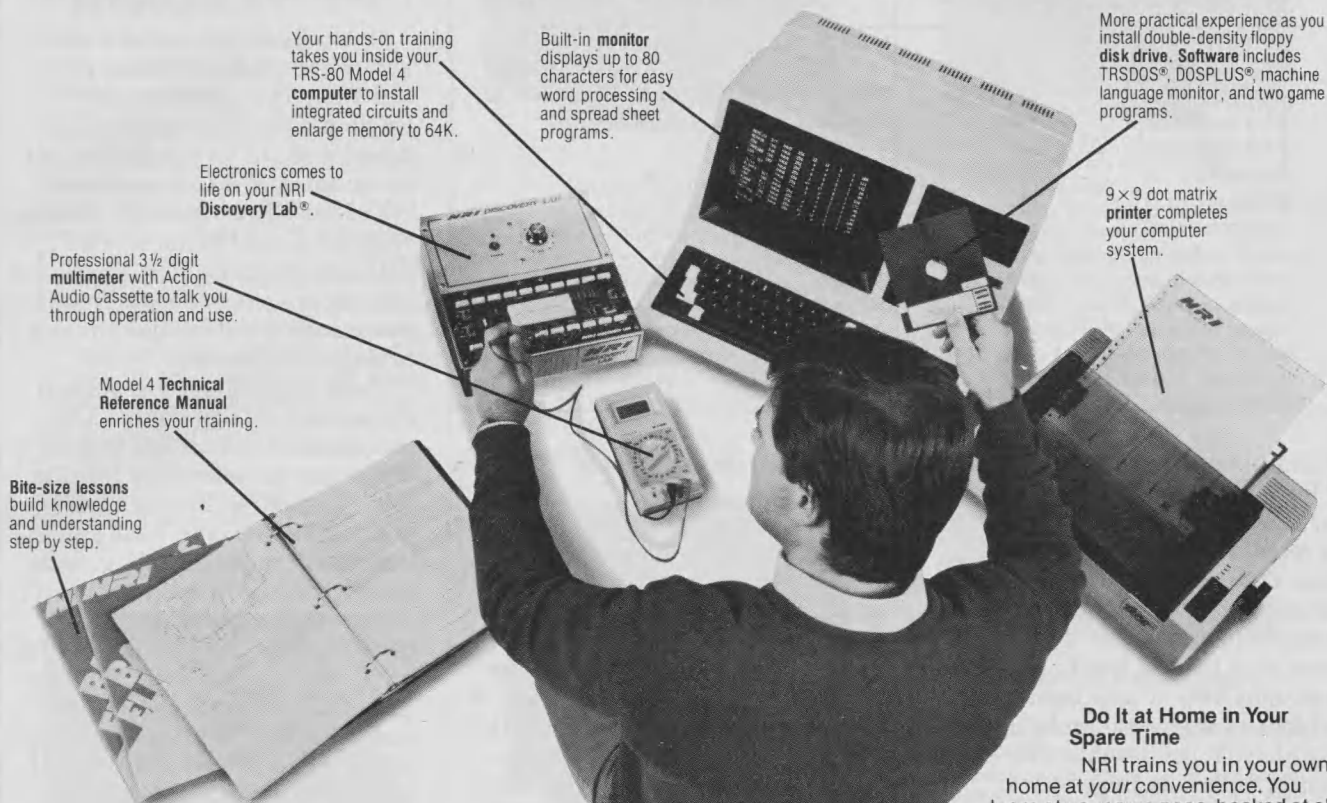
If you're creating your first file, you should select the define function from the browse menu. You're then prompted to type in each field name and field type. Field names may be up to 19 characters long. Field types may be text, number, date, calculation or summary. The first three types of fields are straightforward. The calculation field is a virtual field; that is, it exists as a result of calculations done on some other field. It has no value of its own. The summary field maintains a total, average or count of a numeric field.

When you've defined the file to the system, you're ready to define the layout of your record on the data input screen. Here the visual nature of Nutshell really begins to shine. You can make text fields as long as you need. Other fields cannot extend beyond one line. Prompts can be in color, reverse video or highlighted.

Nutshell lets you use your imagination to design fields as you want them to look. It even includes built-in word wrap for the typing chores you want to do without leaving Nutshell. When you're entering text and you run out of room on one line, the word will be wrapped to the next just like a word processor.



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	KeepIT	Nutshell	Thor
Max field size	70 characters	16 million characters	40,000 characters
Max record size	2,400	16 million	8,000,000
Files open concurrently	1	1	1
Records per file	32,767	Two billion	200
Fields per record	99	60,000	1
Supports color?	no	yes	yes
Copy protected?	no	no	no
Memory required	192KB	256KB	128KB
Screen-oriented	optional	yes	yes
Menu-driven?	yes	yes	Function-key
Price	\$450	\$395	\$295

Table 2. Comparison of three heavy hitters.

Control breaks are also controlled from the partition, as are footers. The documentation on printing reports is one of the weaker areas in the manual, but the material is fairly well-stripped of technical requirements. If you know what control breaks are and have some idea of how headers and footers work, you probably won't have much trouble with printing your data the way you want it.

Nutshell is easy to use. A tutorial provided with Nutshell also helps you to get acquainted. The help files are context-sensitive so you get help for where you are in the program. As you're creating your input form, a number of variations are possible. You mark your text for reshaping by highlighting it. You start at the northwest corner and move to the southeast corner to define text blocks. A press of the enter key results in the block you defined filling up as a text field. There is no limit to the size of the text field except the machine's memory. You can move fields and prompts together or separately. Custom-designed data-entry screens are as easy to make as drawing them on the screen.

## Do Tricks

Once data is in Nutshell, you can perform any number of tricks with it. Most math functions can be applied to your data using the report screens. You can suppress the display of information you don't wish to see, and you can use

Nutshell for quick, "what if" calculations.

The printing functions of Nutshell are equal to almost any task. Headers and footers are designated using a unique partitioning system. The screen is divided into two parts. On the left, the fields to be printed are displayed. On the right side of the screen is the partition where you'll type the description of each line in the printed report. If a line is a header, you type header. If it is part of the body of the report, type body.

The ASCII import and export facility is not as well-designed. The documentation doesn't do the subject justice, and the requirements imposed on file importing are overbearing. You'll have to do a lot of editing because each field must end with a backslash (\) and an ampersand (&) except for the last field in an record, which must end with only a ampersand (&). You'll have to enter these characters to your import file before Nutshell will read in your file.

## Now What?

Having a database with the capabilities of Nutshell (the limits are only hardware-imposed) makes you begin to wonder where we're going. What will the next threshold be? How do you use all the capabilities of a program like Nutshell? Clearly, it's ideal for the executive data manager because it's so easy to use. But using it to keep track of a few names on a mailing list seems like such a waste of power.

Nutshell can be used as a notepad of your daily activities, much like Thor. The unlimited field length for text fields means full descriptions of your activities can be recorded. The examples used with Nutshell are carefully chosen. Nutshell is used in the sample database to catalog properties for a real estate agency. The unlimited text entries make full descriptions of properties possible.

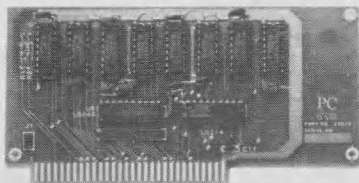
These applications just scratch the surface, though. Perhaps the real question to be asked is, how much can you effectively learn to use? Nutshell, and many other programs reviewed here, have almost unlimited capabilities. Why, then, are so many people disappointed with their purchases? Why the constant search for more powerful programs and new ways of doing things? I think the answer lies in our fascination with gimmicks and in the inability most of us have of learning to use one product well.

The average software purchaser probably uses 75 to 90 percent of the packages sold to less than 25 percent of their potential. How many of you have taken the time to really learn how to make your word processors work for you? How many of you have explored all the nooks and crannies of your favorite database manager? I'll wager that most of us are too lazy to dig into the product and really put the power of it to work for us.

## Worth a Second Look

Nutshell offers a chance to use most of that power because it's so easy to use. Software that's transparent to the user is a good goal, and Nutshell certainly has taken a step in that direction. It's worth a second look if you have to manage a lot of text. A toll-free telephone number and friendly and gracious support make finding the answers to your problems less frustrating than with many software manufacturers. Leading Edge is to be commended for its customer support, another reason for taking a second look at Nutshell.



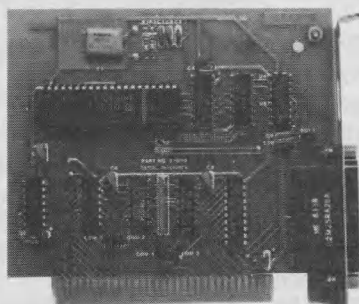


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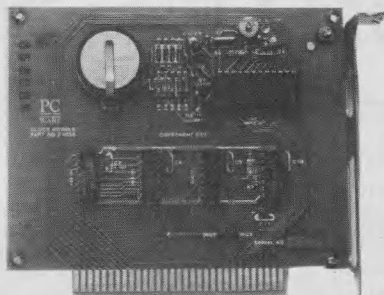


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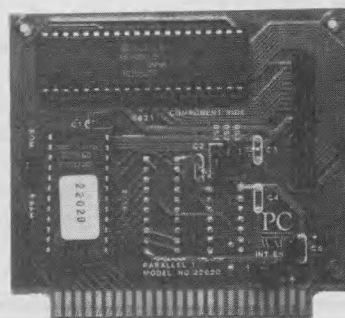


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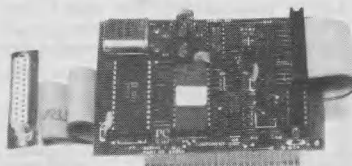


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- Applesoft, Pascal, & CP/M Compatible
- Dual 8-bit bi-directional parallel ports
- Four handshake lines
- Conveniently located ribbon connector

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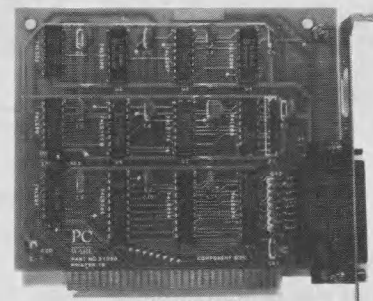


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- Applesoft, Pascal & CP/M Compatible
- 2 handshake lines (ACK\* and strobe\*), 4 status lines (select\*, Busy, Paper out, and Prime\*)
- Centronics data bit 8 may be jumpered low
- Conveniently located ribbon connector

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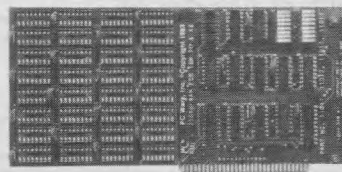


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- May be used as a general purpose I/O port
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- 5 buffered TTL inputs
- Fully Software programmable
- Software controlled interrupts
- Reset of target peripheral/device with system
- Industry standard D-shell connector for I/O

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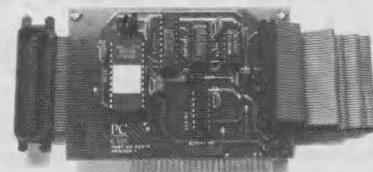


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## Other Happenings

What else is happening at "database"? I received copies of MAG/base 1, 2 and 3 recently. MAG/base offers a system of software that permits you to start small with a file manager (MAG/base 1) and upgrade as your needs grow. MAG/base 2 has the filing features of MAG/base 1 and adds a relational report writer, batch processing features and the ability to work with up to five files for reports, queries and file merges.

MAG/base 3 permits full system development by allowing you access to the components of the MAG program. Menu definition, screen management functions and multilevel password protection are all available in MAG/base 3. All versions of MAG/base support

multikeyed fields, 999 fields per record, 999,999 records per file and 4096 characters per record. The selling point behind all this is that the systems are upwardly compatible. If you start with MAG 1 and need to move up to MAG 2, you'll be able to use the same files; and you won't have to learn a new syntax. I'll take a look at how well this works next month.

## Programs Reviewed

KeepIT  
Martin Marietta Data Systems  
PO Box 2392  
Princeton, NJ 08450

Nutshell  
Leading Edge Products Inc.  
225 Turnpike St.  
Canton, MA 02021

ThinkTank  
Living Videotext Inc.  
100 Elwell Court, Suite 232  
Palo Alto, CA 94303

Thor  
Fastware Inc.  
200 Freeway Drive East  
East Orange, NJ 07018

For those of you waiting patiently for Dataflex and TIM IV, I'm running out of room for this month. They're next in the hopper. I'm also trying to get a copy of Micorim's Clout for evaluation.

Last minute notes: I received KPaint and KGraph this month from Micro Data Base Systems Inc. These add-on programs work with KnowledgeMan, its database manager. I am happy to report that both programs work well and that the documentation has improved. I'm also happy to report that, using a shoehorn, both KPaint and KGraph, along with the rest of KnowledgeMan and its associated utilities, fit on a single disk—with almost nothing left over. This is on my IBM PC, which supports 360KB per disk. Any future enhancements mean splitting up the program onto two disks unless something else shrinks. More on how well they work next month.

I also heard from Martin Marietta that a new multi-user version of KeepIT with record lock-out (called, appropriately, ShareIT) will be out soon. Martin Marietta has also jumped on the mouse wagon with a front-end program for KeepIT called AskIT. ShareIT will be using a board from Cogent Data Technologies Inc. to implement the communications functions. □

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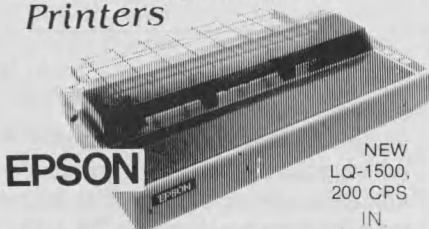
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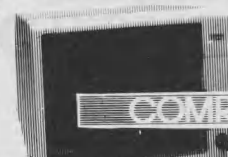
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# The Unix Pipeline

By Phil Hughes

## Unix Security: Permission Particulars

Access:  
Ask and You  
Shall Receive

Last month I described the hierarchical file system of Unix. This month I'll explore the security features of that file system and show you how to use these features to protect your files.

### Ask Permission

In Unix, each file, including directories and special files, has a set of access permissions associated with it. These access permissions determine who can access the file and what type of access is allowed. First, let's look at the types of access.

Read permission means that the file can be read, and write permission means that the file can be written to. Writing to a file includes both appending (adding at the end) and updating what is currently in the file. Execute permission on an ordinary file means that it can be run by entering its name. If it is an executable program (binary), it will be loaded and have control transferred to it; otherwise, it's assumed to be a file of shell commands. The shell will read the file and execute the commands it contains.

If the file is a directory rather than an ordinary file, each permis-

**Unix access permissions apply to three sets of users—you, your group and everyone else. If the file is a directory, each permission has a different meaning.**

sion has a slightly different meaning. Read permission means that the file can be read as if it were an ordinary file. This is the permission the shell needs to do wild card expansion. Write permission allows you to create and delete directory entries. Execute permission means you can search the directory. In other words, you can use it as a directory to look up a filename.

The three sets of users that the permissions apply to are you, your group and everyone else. You and everyone else are self-explanatory; groups take a little more explanation. Each user's password file entry contains a field that identifies what group he is assigned to when he

logs in. Another system file, */etc/group*, identifies the groups of which you're a member. You can change your current group to any permitted group by using the *newgrp* command. For example, if the group file says that you're a member of the groups *engineering* and *project-14*, you could change your current group from *engineering* to *project-14* by entering the command:

```
newgrp project-14
```

Fig. 1 shows a sample long list (*ls-l*) of a directory. In that list, the first field in each line is the access permission information. In Unix, this is commonly called the protection mode of the file. For example, the file *framus* has access permissions of:

```
-rwxr-xr-x
```

The first character indicates whether the file is a directory, special file or just an ordinary file. In this case, it's a dash (-) indicating that *framus* is an ordinary file. If *framus* were a directory, this character would be *d*. If it were a special file, it would be either a *b* (for block device) or a *c* (for character device).



```
total 23
drwxr-xr-x 4 phil 64 Mar 28 19:09 articles
-rwxr-xr-x 1 phil 9304 Mar 24 11:36 framus
drwxr-xr-x 2 phil 112 Mar 28 19:09 junk
-rw-r--r-- 1 phil 26 Jun 11 1983 stuff
-rw-r--r-- 1 phil 299 Mar 28 14:06 test
```

Fig. 1. The result of executing `ls -l`.

The next nine characters are divided into three sets of three characters, corresponding to the permissions for owner, group and other. Each of these sets contains a letter for read permission, write permission and execute permission. The information is positional. If the permission exists, the associated column will contain the letter r (if read), w (if write) or x (if execute) permission. Otherwise, the column will contain a dash (-). Fig. 2 shows the permissions for the file *framus* in tabular form.

## Set-Up Time

Now, let's look at how you can use this information to securely set up files. The `chmod` command is used to set the protection modes of files. Fig. 3 shows a summary of the syntax for `chmod`. There are two ways to specify the protection modes to `chmod`. You can either use a symbolic representation or an octal number for protection mode. The symbolic form is easier to use, and that's what I'll describe here.

For example, if you have a file called *mydata* in your current directory and you want to set the permissions so that you and members of your current group have both read and write permission and others have no permissions, you enter:

```
chmod gu=rw mydata
```

The g and u stand for group and user, the r and w stand for read and write. The equals sign (=) tells `chmod` to set the mode to whatever is specified.

If you decide you want to add read permission for others to the same file, you'd use the following command:

```
chmod o+r mydata
```

The o stands for other and the r for read. The plus sign (+) instructs `chmod` to add the specified mode bits to the current protection mode.

If you initially knew you wanted to allow read permission to everyone and allow write access for yourself and your group, you'd use the command:

```
chmod =r,gu+w mydata
```

or

```
chmod gu=rw,o=r mydata
```

	read	write	execute
owner	X	X	X
group	X		X
other	X		X

Fig. 2. Permissions for the file *framus*.

The first command sets read access for all (default), then adds write permission for user and group. The second command sets the access permissions for group and user to read and write and the access permissions for other to read. The result is the same. There are also other valid ways to set the permissions as desired, but this should give you the general idea.

You may have noticed the s and t modes in Fig. 3. The s, or set ID on execution, mode is used to allow a user to have the access permissions that a program owner has while he is executing the program. In other words, if I set the set user ID bit in the access permissions of one of my programs, you'll be granted file accesses as if you were I while you're running that program. This is an important capability.

A common application would be for a database accessed by multiple users. You can ensure the integrity of the database by setting up the data files so they can only be accessed by the database administrator and by setting up the database programs so that they are owned by the database administrator, are accessible to other users and have the set user ID bit set. Each user can access the data through the database programs but can't read or write directly to the database with his own program or a system utility.

The t, or save text mode, bit is useful in systems tuning. It's commonly called the sticky bit and tells the operating system to save the swap image of the program after execution. It's commonly set on heavily used programs like the editor. Then, the next time someone executes the editor, the saved swap image can be quickly executed instead of having to search the file system and load a new copy.

## Umask Unveiled

Default access permissions are automatically assigned to new files as the files are created. The `umask` command can be used to limit the maximum permissions allowed during the process. For example, if you create a file using `cat (cat >testfile)`, the permissions will be set to read and write for all. If you want to change this default, you can use the `umask` command to further restrict these permissions before creating a file. If you generally want your default to be other than the system default, you can include an invocation of `umask` in your .login or .profile.

Here comes the confusing explanation of `umask`. A logical and is performed between the complement of the current mask value (set by `umask`) and the requested permissions at file creation time. The result is used as the protection mode of the new file. Note that this is the complement of `umask`, not its value. No, there are no symbolic mask settings; they are in octal.

Let's look at an example. If you wanted to ensure that any files you



create can have no permissions other than read, write and execute by you, and read and execute by your group, then you'd set up a mask value with those corresponding bits set to zero, the others set to one. Looking at the numeric bit explanation for `chmod` in Fig. 3, the last three digits of the mask are for owner permission, group permission and other permission, respectively. In each digit, the bits are 04 for read, 02 for write and 01 for execute permission. You want to restrict all three for other and write for group. The corresponding mask specified in octal is 027.

## No Easy Way

I wish there were an easier way, but that's the only choice. The following two things may help you out when you first start working with `umask`. Entering `umask` with no arguments will cause your current mask to be displayed (in octal, of course). The following three command sequences will show you which read and write permissions get set at file creation time.

```
date >/tmp/$$
ls -l /tmp/$$
rm /tmp/$$
```

What this does is create a file, print out the directory information and then remove the file. The `$$` is shell shorthand for the process number of your current shell. Therefore, the file created is in the `tmp` directory and has a name equal to the process number of your shell. The `date` in the first line could have been any command. If you are using a system with Bourne shell (rather than `csh`), you could just leave out the command. The shell will just create an empty file.

Here are some important things to remember concerning file security:

- Only the file owner (or the super user) can change file modes.
- `umask` only affects permissions when a file is created.
- `chmod` can be used to alter the permissions of files you own.
- Set User ID and Group ID can be used to allow restricted file access.

## As the cost of hardware decreases, you'll see more capability on each user's desk.

- If you allow someone write access to a file with the set user ID or group ID bit set, they can violate security by copying their program over yours. The set bit will be preserved.

## Seattle User Group

On May 8, I attended an organizational meeting for a local Unix user's group. The meeting was at the University of Washington Faculty Center and about 180 people at-

tended. Credit for organizing this initial meeting goes to David Herington of Sun Microsystems. He found the location, found the attendees, found a speaker and found someone to foot the bill for food and drink—a lot of work. Thanks, David.

The speaker was Bill Joy, the primary architect of the BSD (Berkeley Software Distribution) enhancements to Unix. Bill is now working at Sun, which makes Unix workstations. His talk was on using Unix as the "glue" to connect small and large computer systems together. Much of the talk referred back to his work at UC Berkeley. It was interesting and showed that Bill has great depth of knowledge in Unix and computing in general.

One of Bill's points was that as the cost of hardware decreases, you'll see more capability on each individual's desk. He sees each user having a machine roughly the equivalent of a VAX 11/780 on his desk,

### CHMOD - Change Access Modes

% `chmod` mode files

Mode can be numeric or symbolic. The symbolic case consists of the form `[gou] op perm` where:

- g** group access permissions
- o** other access permissions
- u** user access permissions
- Default is all access permissions

`op` is one of the following:

- +** adds the permission to current status of files
- removes the permission from current status of files
- =** sets the permission of files to specified value

`perm` is one of the following:

- r** read permission
- s** set owner-ID or group-ID on execution
- t** save text mode
- w** write permission
- x** execute permission

Multiple symbolic modes are separated by commas

The numeric case is formed from:

- 4000 set user ID on execution
- 2000 set group ID on execution
- 1000 save text image after execution (sticky bit)
- 0X00 owner's permission, where X is OR of:
  - 04 (read), 02 (write), 01 (execute)
- 00X0 group's permission
- 000X other's permission

Fig. 3. Syntax of `chmod` command.



connected through a local area network to a super computer. For today, that individual computer will be composed of a 68000 system running Unix and connected to other systems through Ethernet. He also predicts that a computer with capabilities equivalent to those of the Apple Macintosh will become as common as a telephone is today.

One interesting question concerned standardization. Joe Brady asked if Sun supported the /usr/group proposal for standardization of Unix.

A five-person board of directors was elected at the meeting to perform the initial organization of the group. They're in the process of sending a survey to all attendees to gather further information, but so far the following decisions have been made:

- The name of the group is S/ug. If you don't think the name is humorous, you probably don't know that everyone in western Washington thinks the state animal is the slug.

- Meetings will be held on the fourth Tuesday of each month.

- Quarterly meetings are planned with big names in Unix as guest speakers.

- Dues are \$25 a year for individuals, \$250 for institutions.

Bill said that Sun supports it but will wait and see what IBM introduces into the market and then make the necessary changes to be IBM compatible. He expects that most other vendors will do the same.

If you have any questions you can contact Irene Pasternack, board chairperson for S/ug at 206-FOR-UNIX.

### Search for Shell Tricks

Does anyone out there have any interesting shell scripts? I have columns in the works on the shell and would appreciate your sharing any shell programming tricks. I'll send a Unix command summary to anyone who sends me a script that I use in this column.

Next month I'll attempt to demystify regular expressions. I'll show you how to use `grep` to find information hidden in files. Also, I expect to have an opportunity to use an AT&T 3B2/300 computer. I hope to be able to report the results by next month. □

*Address correspondence to Phil Hughes, PO Box 7, Northgate Station, Seattle, WA 98125-0007.*

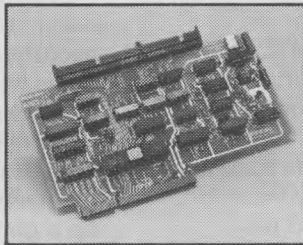
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# Connect Time

By Chris Crocker

## On-Line Investments

### Find Fortunes Via Your Phone Lines

If you're thinking of making some investments, there are several considerations to keep in mind. Naturally, the most important thing is to come out ahead of the game, i.e., with more money than when you began. Unfortunately, that's about the only thing that's easily understood about investments. The rest is pretty technical and is the subject of a multitude of books and newsletters. I'll explain only the terms inherent to an understanding of the financial service I'm discussing.

#### Financial Services

Most investment information is available through financial publications and annual reports. In fact, it takes a lot of research to make a sound investment decision. The on-line financial services make this information much more accessible by allowing investors to obtain market prices as little as 15 minutes old. With this information, on-line investors can make qualified investment decisions rapidly and stay ahead of off-line investors.

The Source, in a recent issue of *Sourceworld*, touts a success story where an on-line observer caught

early signs of things happening at Braniff and managed to get his order in, while many market watchers had to wait for the next day's paper. He bought at 2¼ and sold within 24 hours at six. While a good broker or analyst would see the same thing coming, those of us who watch out for our own interests can also capitalize on such early information.

#### The Basic Services

On-line investment services generally fall into four categories: current price information (current market prices), analytical and supporting information (historical and fundamental data), secondary sources (newsletters, advice) and news wires. Most of these elements are supported on all of the major utilities at varying levels.

#### Current Price Information

On-line services help investors keep track of current prices throughout and after the trading day without having to call a brokerage. To retrieve current quotes on any service, just type the code or select the menu option for current market quotes. On Dow Jones, the selection is //CQ; on CompuServe, it's Quick-

Quote from page FIN-20. On The Source, the command is Stock-check. When prompted, type in the correct symbol for the stock, option, bond or mutual fund for which you'd like a quote. If, for example, you select Apple Computer, all you do is type the symbol AAPL, and something like Fig. 1 appears on your screen.

Dow Jones allows you to access as many as five market quotes simultaneously. The Source and CompuServe let you predefine your portfolio, so as soon as you make a request, the current prices for your defined portfolio are updated automatically. I'll talk about how to set up a portfolio later.

For commodities traders, The Source and CompuServe carry the Commodity News Service, which includes current news and prices on all major commodities exchanges, weather, agricultural, economic and political reports. On The Source, the prices are updated every ten minutes. On CompuServe, they're updated every 20 minutes.

#### Analytical and Supporting Information

Fundamentalist investors can



have a field day with the supporting information available on these utilities. Off-line analysts can spend hours digging up information about companies, their financial status and their historical performance. But now, much of this information is accessible on-line.

For example, if you'd like to add some diversity to your portfolio, you might request basic information about how certain industry groups have performed compared to other industry groups (e.g., utilities versus transportation). Media General financial services, available on Dow Jones (//MEDGEN) and The Source (Stockvue), provide fundamental data and price and volume data on more than 3000 companies on the American, New York and OTC exchanges.

Price and volume data provides stock price action and volume. Fundamental data includes earnings, dividends, revenues, ratios and shareholdings. Not only does Media General provide data extracted from annual reports and other sources, but it also performs some handy analytical calculations to help interpret the data. For the casual investor, this saves the headache of putting together a reasonable fundamental analysis of a stock or industry group. CompuServe uses a similar fundamental information service, provided by Value Line.

Once you've selected the industry group that best suits your goals at an acceptable level of risk, narrow your search to the handful of best performers within that group. If you've already seen the current prices, look at fundamental and price data for each specific stock. Then, check earnings per share, price/earnings ratio, dividends, yield, growth rate, beta coefficients, five-year growth rates and the like.

Many investors select a stock on the basis of a set of fundamental criteria. CompuServe and The Source (and soon Dow Jones) let you screen the market for stocks meeting your specific investment criteria (P/E, betas and so on). Using Compu-

Serve's Screen program or Stockvue on The Source, you select simple criteria such as a price to earnings ratio less than eight and a yield of better than 11 percent, if you want. It's a great way to zero in on the best values.

When the handful of potential stocks is narrowed to a select few, it's time to look more closely at the companies. On the Dow Jones News/Retrieval, Disclosure II provides some insight into the inner workings of approximately 6000 companies.

Disclosure II provides corporate profiles, balance sheets for two years, income statements for three years, quarterly income statements for three years, line of business data and five-year summary data (revenues, earnings per share, income and so on). Also provided are officers and directors, ownership and subsidiaries, other corporate events, management discussion, a two-year list of reports on file with the SEC and information about ordering the text of those reports.

If you want to know the nitty-gritty about a company, it's probably here—keep in mind that not all of the information is available on every listed stock. CompuServe's comparable service is Standard and Poor's General Information File, which provides a summary of the business, developments, product or service contribution to revenue and profits, directors, officers, five-year earnings per share growth rate and Standard and Poor's assigned dividend rank.

## News wires

It's important not to forget the forest for the trees. If interest rates are climbing, inflation rates are soaring, housing starts are plummeting, M1

is out of control and bond investors are taking a beating, it may not be the best time for you to enter the market. But it's important that you know about it. It's just as important to know that an open takeover bid is underway or that the economic outlook is improving for a certain industry group. If you're a commodities investor, you'll also probably want to keep an eye on the weather.

Market investors must watch not only the individual stocks but also the environment in which stocks are traded. World, business and economic news are staples for the serious investor, and all of the networks offer up-to-the-minute news from various wire services. Naturally, Dow Jones News/Retrieval uses the Dow Jones News Service; The Source carries the UPI wire and the AP stock and Videotex services, as well as the Commodity News Service. CompuServe carries the AP wire, the Canadian Business Information wire and the Commodity News Service.

One interesting (and extremely useful) feature of the Dow Jones wire is that you can request news headlines and abstracts regarding specific stock selections. If, for example, you wanted to follow the Disney takeover speculation, you'd enter Dow Jones News and type .DIS[return]. The most recent story regarding Disney Productions will appear on the screen. You may also select a list of headlines for the most recent stories and then select the text of the stories. The Dow Jones News stories are as current as 90 seconds and can be retrieved as far back as 90 days.

## Secondary Sources: Newsletters and Advice

Among all of this raw financial in-

STOCK	BID CLOSE	ASKED OPEN	HIGH	LOW	LAST	VOL(100'S)
AAPL	30 3/8	29 3/8	30 3/8	29 1/4	30 3/8	10817

Fig. 1. Apple stock screen display.



formation are a number of on-line newsletters commenting on the markets, the economy and advising investors of potentially good investments.

Every investor has a favorite newsletter. The Source carries Management Contents Ltd. (abstracts of articles from magazines ranging from *Forbes* to *Harvard Business Review*), *US News and World Report's Washington Letter* and *Raylux Financial Commentary and Business Outlook*. Dow Jones contains selected sections from the *Wall Street Journal*, as well as the full scripts from the four most recent editions of the popular TV program, "Wall Street Week." CompuServe's financial publications include: *Stevens Business Reports*, *The Computer Wire* (R), *Business and Law Review*, *Money Market Services Financial Analysis* and information and tips from Max Ule and Co. and Evans Economics Inc.

### On-line Trading?

CompuServe may soon offer a discount brokerage service on-line. I was fooled by a menu option that said "order on-line," thinking that I could try to place an order. Unfortunately, the next screen after that option said "coming soon."

This is by far and away the ultimate for the informed on-line investor. After gleaning the necessary information, analyzing the data and reaching a conclusion, you can take the next big step: make buy and sell orders directly through your computer. Although Max Ule and Co. already offers on-line trading through its tickerscreen BBS (see "Bulletin Boards Visited"), it's still not ready on CompuServe. I'm looking forward to reviewing the option when it is.

### Cutting Corners: Predefining Your Portfolio

If you must check the market frequently, CompuServe and The Source let you predefine your portfolio so that you can get right in and obtain the current prices on all of your common or preferred stocks.

CompuServe's Microquote program lets you set up your portfolio and track its performance using the QPORT command from the PROGRAM: prompt. The system asks you to enter the stock issues, the purchase date and the purchase price. Your portfolio is stored in your filespace, and each day when you call up the portfolio, it reports the current price and your net gain. You may track several portfolios, using different filenames.

Here's how to define a portfolio file called Mystocks on The Source. First, get to command level and type ENTER[space](MYSTOCKS)[return]. You'll now be prompted to enter text. At this point, type the correct symbols for the stocks you want to check, separated by single carriage returns. To close the file, press return twice. Now that you've created a portfolio file, enter that filename (in parentheses) whenever you're in Stockcheck and are prompted to enter the symbols you want to check. Stockcheck only provides current price and volume data for your portfolio; it doesn't perform calculations.

There's no option to set up a portfolio on Dow Jones News/Retrieval, but you could set up a file on your own system with up to five stock symbols in it and then upload it when you're prompted to enter the stock symbol. Be sure to separate the symbols by spaces.

### All the Way

To automate the process even further, you can set CompuServe and The Source to automatically bring you straight to the service of your choice. There are a couple of ways to do this on CompuServe. First, through the Terminal Settings option at sign-on, you can request the system to move directly to the appropriate financial page (as well as first checking your mail). The other method uses the MicroNET programming area. To go very far into this sign-on method would involve some thorough documentation on

MicroNET. You can order *The CompuServe Personal Computing Guide* through Feedback on CompuServe for \$3.95.

The following automatic sign-on illustration from The Source is to give you an idea of how efficiently you can check on your stocks. If you routinely get prices on the same stocks, it can work to save you money. The Source has an automatic sign-on file called a SID file. This file may contain a command or a string of commands to bring you automatically to any spot on the system—it will enter your commands too, if it's set up right. Your SID file can also take you right out again, limiting the time on-line to a bare minimum.

If you have the ability to download to buffer or disk space with your communications software, you can use the following SID setup to sign on, download your stock quotes and sign off again, without ever making a keyboard entry after your ID and password. Another possible option to consider would be to include a MAILCK command at the start of the file.

To set up a SID file, get to Command level and type:

```
ENTER SID[return]
to open the file. After the Enter Text
prompt appears, type:
```

```
STOCKCHECK[return]
and then, just as they appear below,
type:
```

```
1[return]
[Mystocks][return]
[space][return]
QUIT[return]
OFF[return]
[return]
```

The final carriage return closes your file. From now on, when you sign on, set your computer to save the downloaded data in buffer or disk space. After entering your ID and password, the SID file takes over, grabbing your stock prices and getting out again and off the system. Now, you may read through the current prices on your own time, not



The Source's. If you like to check through other stocks after checking your own, close the above SID file after typing (Mystocks) and pressing return. If you want to interrupt the SID file while you're on-line and it's running, just send a Break (Control-P) and you'll return to command level.

### Premium Charges

There's a premium for most of the truly valuable investor services. For example, you pay a premium to use Standard and Poor's, Value Line or MicroQuote on CompuServe. On The Source, Management Contents and Stockvue are premium (Source-plus) services. On Dow Jones, your charges are based on the service or database you're using.

Compared to the others, Dow Jones is relatively expensive. (For example, reading the *Wall Street Journal* on-line costs more than \$70 per hour, and current market prices during prime time cost more than \$50 per hour.) The Dow Jones prices drop considerably after hours, so if you can bear the delay, you might want to consider waiting for the lower rates. I suppose if you invest wisely, the premium rates will pay for themselves and then some.

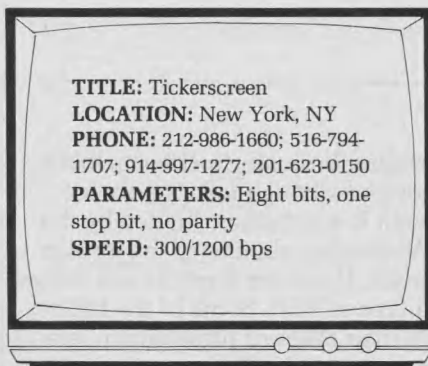
Space hardly permits a complete overview of the services for investors on these utilities, but the benefits of these on-line databases and news information utilities are clear. Beyond what I discussed here are quite a few more financial services on networks like Delphi and News-Net. One general suggestion: before you decide to sign on and peruse the financial areas of any service, check the manuals and other information carefully. Map out your plan before you sign on. It's easy to get lost or waylaid in the sheer volume of information; you might lose in connect time and service premiums a fair piece of the money that you gained on the market.

Next month, I'll be dedicating the entire column to free (and some not-so-free) bulletin board systems, ranging from the obscure to the practi-

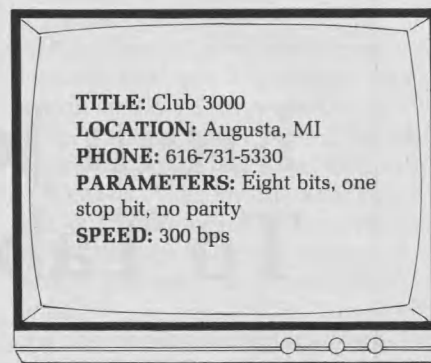
cal. In the meantime, I've listed a few investment bulletin boards. If you don't have a subscription to one of the on-line services, or if you don't want to pay the premiums, you might want to check these out.

### BULLETIN BOARDS VISITED

I started out with a sizable list of potential bulletin board systems that focused on market trading. Unfortunately, most have been disconnected, don't answer or no longer have a financial bent. From my original list, only two remain: Max Ule and Co.'s Tickerscreen, and Club 3000.



Tickerscreen is operated by discount broker Max Ule and Company. The service is available on weekends and evenings only. In addition to some straightforward information (even I could understand it) about some of the investments available, this system lets you enter orders on-line! Don't jump yet, though. They're not going to let you do anything until you set up an account with them and get your special password. Use your first time on to check out the system and order a brochure. When I logged on, information was available on NYSE closing prices, IRAs, Ginnie Maes, Rothschild Earnings and Liquidity (REAL) funds, stock index options trading and zero coupons. In addition to information and on-line ordering, the system also helps you figure the commissions on any order.



Club 3000 is a basic bulletin board system specifically for idea exchange on commodities trading. In addition to scanning, reading and sending messages, you may search the database for specific keywords. For example, a search for the keyword "options" brought up the message "Today's commodity options" and a telephone number to call. Discussion on the bulletin board ranged from comments on books about trading commodities, requests for software and hardware information and requests (as well as responses to requests) for information on general commodities topics. If you're thinking of getting into commodities, it might be worth a call.

### A Special Thanks

Finance isn't my long suit. But after a few days working on-line with Mike Bois, something of a part-time stock market aficionado, I've taken a shine to the investment world.

Mike takes in *The Wall Street Journal* like most of us drink our first cup of coffee in the morning, and he reads every financial publication he can find. He tells me that information is essential to investors. Mike's not the sort of person who's easily excited, but even he was impressed with the information available to investors through on-line services like Dow Jones News/Retrieval, The Source and CompuServe. Mike gave me a hand with this month's column. □



# Techniques

By Mark Robillard

## From Joysticks To Tablets

### An Introduction To Position Entry Devices

I'm sure all of you have played video games. A few years ago, activities like Space Invaders and Missile Command were the in thing.

One positive aspect of this is that many of you were introduced to something called a position entry device, or PED. The joystick or paddle controller that your sweaty hands manipulated in such frenzy was a simple position entry device, used to help position your cannon or missile launcher on the screen.

#### Device Types

Long before the advent of home video games, researchers and engineers used similar PEDs in their everyday work. Positioning a small cross-hair cursor by joystick is an integral part of computer-aided design (CAD) systems. Depending on the accuracy desired or the speed required, different PEDs are employed. This month, I'll explore the operating principles of these devices. Along the way, I'll develop various interfaces so that you can connect them to microprocessor control circuitry.

Accuracy and speed usually determine which PED to use. You should

realize, through experience, that a joystick, though fast, is a device with low accuracy, limited by the positioning abilities of the human hand. However, joysticks are indeed a type of PED. Some of the others, in their order of presentation, are paddle, trackball, mouse and tablet.

First, I'll examine the operating characteristics of the joystick. Basically two types of joysticks are used. The Atari video game made the switch-type joystick popular. The other type is analog in nature.

#### Switch Joysticks

Many of you are familiar with the four-cursor control buttons on most keyboards. The layout varies from system to system but the functions remain the same. The switch-type joystick emulates these directly. Each deflection of the control stick depresses one or more momentary action switches depicting a desired direction. This action is shown in Fig. 1. There you see that, depending on the direction of control stick deflection, a pattern of switch closures is presented to the output lines.

Speaking of outputs, somewhat of

a standard among switch-based joysticks has emerged insofar as their output interface connectors go. The nine-pin delta style connector and the pin assignments shown in Fig. 2 initially surfaced as part of the Atari 2600 VCS; however, they've spread to other systems using joysticks such as the Commodore series of home computers.

Interfacing a switch-type joystick to a microcomputer is a relatively simple task. With four outputs, there are only 16 possible combinations. In actuality only nine of these show up in normal use. A microcomputer equipped with some sort of parallel input port can easily detect all available patterns.

Looking at the switch connection schematic (part of Fig. 2), you see that among the connections is a common line that forms a fifth interface point. This line may be tied to a common ground to provide a reference when detecting a switch closure. By pulling up each of the four direction lines through 10k $\Omega$  resistors, contact closures are sensed as logic low levels.

The software required in this interface is as trivial as the hardware.

If the microcomputer employs a programmable LSI parallel input chip, the setup software may be more complicated than the code to read and decode switches! Fig. 3 provides a flowchart of a simple routine that reads the four inputs from the joystick and branches to the appropriate direction subroutine.

## Direction vs Speed

What I just covered is a simple interface to the simplest PED. Directional information was encoded into a four-bit logic pattern. What didn't come from the joystick was any information regarding movement rate. Home video games provide speed regulation on their own using software loops. Generally, you have no control over how fast your cannon sweeps across the screen. However, industrial users of CAD systems are quite used to controlling both direction and speed with the same joystick.

Two types of PEDs are available. They differ in how the information on position is relayed to the computer. These types are absolute and rate. I was discussing an absolute positioning joystick—no rate information is provided. However, through a software change in the parallel input driver, speed information may be simulated.

Assume that, in order to provide speed information, the operator holds the stick in the same deflection angle for a long period of time. To traverse the entire screen, the operator would do this as a matter of course. However, the software may be written so that after a predetermined time interval, the inputs are sampled at a faster rate, constituting a rate vs time algorithm. Therefore, the motion of the cursor speeds up the longer the joystick is fixed in a certain position. Fig. 4 depicts a routine that will provide this function.

## Analog Joysticks

Believe it or not, that's about all you can do with a switch-type joy-

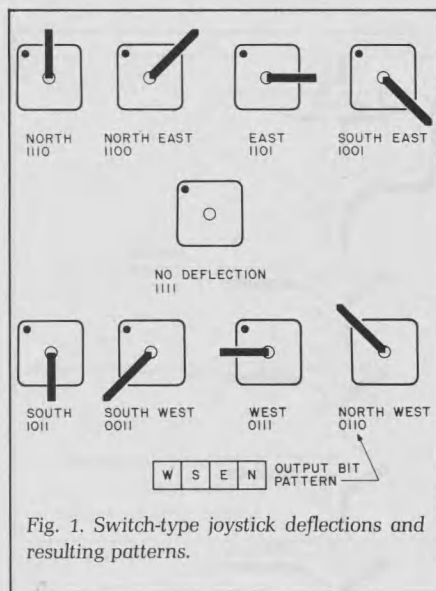


Fig. 1. Switch-type joystick deflections and resulting patterns.

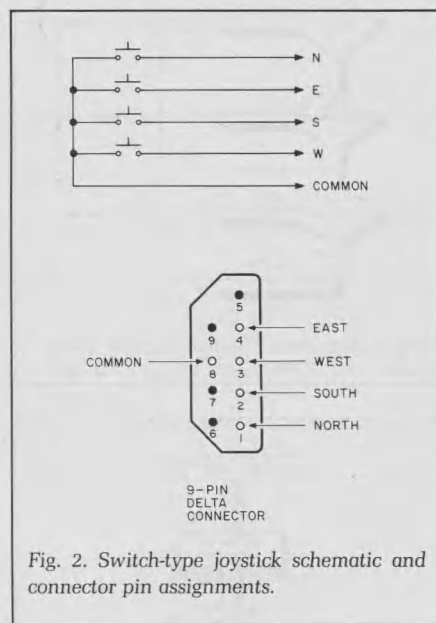


Fig. 2. Switch-type joystick schematic and connector pin assignments.

stick. As I mentioned earlier, two types of joysticks are currently in use. The analog type uses two or more variable resistor elements connected to mechanical mechanisms called bails (Fig. 5). Deflecting the control stick moves one or all of the bails that turn the variable arms of the potentiometers. Basically this is a series of simple volume controls ganged to a control stick. Because variable resistances are involved, only analog methods of interfacing are appropriate. The microcomputer will actually measure slight variations in voltage as a bail moves from one end of deflection to the other. This is done through the use

of an analog-to-digital converter (ADC). Many of these converters are available in single IC packages that run on single +5V supplies.

Fig. 6 shows how a typical two-dimensional joystick is interfaced to an eight-bit ADC. In this application, each potentiometer may be represented as a varying voltage source. The maximum resolution would be one part in 256. Therefore, in a one-dimensional plane alone, you end up with an increase of 32 times the information represented in all eight directions of the switch-type joystick.

It's obvious that the accuracy of an analog joystick is much greater. However, the software required to convert all those numbers into direction is slightly more complex. Generally, the microcomputer must signal the converter to start a conversion. When the conversion is complete, the ADC will signal via a similar handshaking signal that valid data is available at its output lines. Most of the devices employ an eight-bit bus structure that allows direct connection to the bus and appropriate read/write control signals.

Today's integrated ADCs allow several varieties of four- and eight-channel input models, so several analog joysticks can be connected to the same converter. Simply selecting which channel to digitize allows simple uncomplicated joystick driver routines. These joysticks aren't limited to only two dimensions. By adding a third potentiometer on top of the stick, a third dimension exists. This may be used for such functions as panning, where the entire scene depicted in the television window is shifted to the right or left, or zoom, to bring objects closer or move farther away.

The design of a software driver routine for use with analog joysticks involves the comparison of read voltage amplitude values against those read previously. In this way, relative direction may be surmised. For instance, if the value read is greater than that read previously, it can be assumed that the control stick is



moving in a positive direction. In terms of a simple Cartesian coordinate system, this would relate to a positive or negative direction along either the x or the y axis.

Assuming that there is a potentiometer for each axis, you can arbitrarily set a center point where both axes intersect as values  $x = 128$  and  $y = 128$ . Of course, this assumes an eight-bit conversion is made. Values read that are less than center are assumed to be negative, and values more than center are positive.

Rate information may be extracted from the raw amplitude data, but it's a more complicated process than previously discussed. You can write an algorithm that extracts the difference values from one reading to the next and compares these against a table of rate values. However, in a system such as this, if you allow the software to plot each absolute value read, separate rate information isn't necessary. The cursor will appear to zip across the screen just as fast as the control stick is moved. Fig. 7 shows a simple analog joystick absolute position driver.

## Paddles

The early video games employed paddles as PEDs. Because the action on the screen was limited to simple up and down motions, a single-dimension device was quite suitable for operator input. Paddles are basically single-dimension analog joysticks. They employ potentiometers as the variable element and may be interfaced just as I described previously.

Two types of paddle controller are available. The ones used with the early games had limits built in so that they turned only some fraction of a complete circle. With the advent of the video race games, paddle controllers that employ continuous turn potentiometers emerged. Paddles are commonly used in industry today. However, the name "paddle" has been exchanged for "valuator" or simply "dials."

In sophisticated CAD systems, there's frequently a need to provide

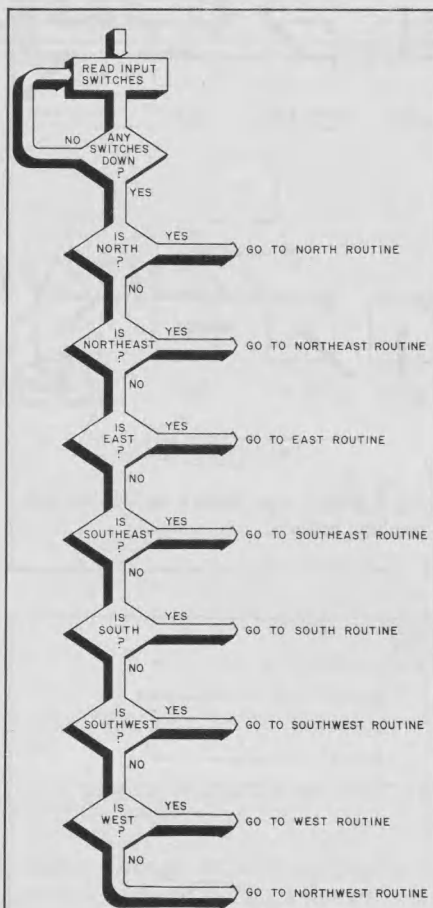


Fig. 3. Flowchart of simple joystick driver.

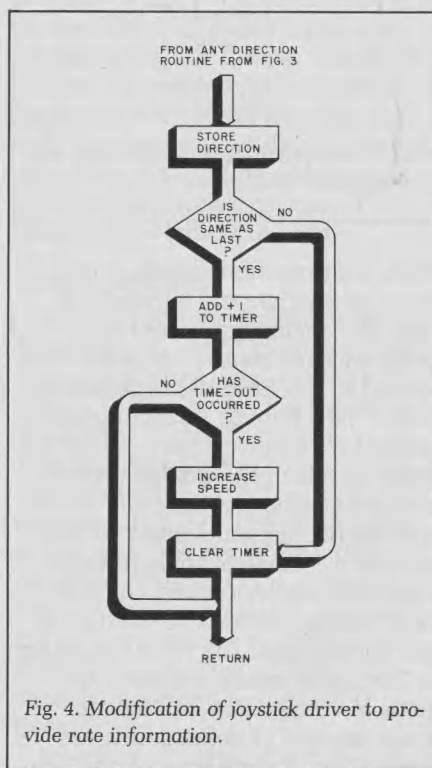


Fig. 4. Modification of joystick driver to provide rate information.

slowly changing numeric values that either increase or decrease in magnitude. When rotating an image, these values are input to a complex equation. To do this, several of these "dials" are typically mounted on a small cabinet. A single serial output line carries amplitude and direction values for each dial in a preset sequence.

Building such a device with eight dials is a fairly simple task using a circuit like that shown in Fig. 6 but using an eight-channel ADC. As each channel is selected, simply run the same software driver shown in Fig. 7. From here, just have a separate place in memory to store each dial's value. Then, whatever operating software you're using will be able to manipulate the data.

## Trackballs

You might have noticed that, toward the end of the big video game boom, a new PED was introduced to the home marketplace. Although it had appeared for years as a main input device in the coin-op business, trackballs became the next thing every video enthusiast just had to have.

Surprisingly, a trackball can provide the same directional information a joystick can. In fact, it also automatically provides rate information. Let's examine what makes the trackball tick and then interface one.

Fig. 8 outlines the basic operating concept of the device. As you can see, the design centers around a free-rolling ball of hard plastic that sits in the middle of the unit. As the ball is rolled, friction causes two small roller pads to turn. These pads are connected by shafts to an optical encoder. Signals leaving both encoders are sent to a custom integrated circuit where they're converted to the standard switch-type joystick outputs.

Industrial use of trackballs typically omits the custom IC and encodes the optical signals directly. Depending on the brand of trackball, the optical encoder signals may differ;

however, in a majority of cases, they are the same. The output of the encoders usually follows something called quadrature phase signals.

Two signals come from each encoder. These signals are labeled A and B. So, in total, the four output signals are xa, xb and ya, yb. Each one of these signals consists of a pulse train that indicates the distance the ball is rolled. For a close-up look at the encoder operation, see Fig. 9. Two sets of holes are spaced at equal distances around the circumference of the encoder disk. They provide the A and B signals. You'll notice that one row is 90 degrees out of phase with the other. Optical emitter-detector pairs are positioned over each row so that the holes allow the light beams to pass and complete a circuit.

Directional information is obtained by monitoring which detector is enabled first. In this way, pulses from one detector lead the other. As soon as the leading signal slows to become the lagging, you can assume that the direction of the ball has changed.

Rate information comes from the period between pulses on any given direction signal. When the ball comes to rest, all pulses stop and the x and y outputs assume any state, depending on whether the detector is over a hole or not.

Software written to handle raw trackball information can be complex; however, let's explore some applicable techniques. Assume that all four signals are connected to a simple parallel input port. Sampling these lines will have to be done at a rate faster than the trackball can produce pulses or you'll lose valuable data. Also, some mechanism for storing the last reading for lead-lag comparison will have to be worked out.

Follow the flowchart (Fig. 10) as I go through a typical sample. The first thing to do is to read the state of each input and store it in a temporary storage location. This will determine which signal is leading. From here several more samples

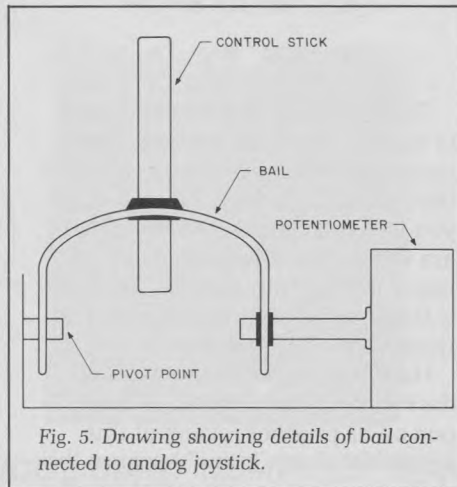


Fig. 5. Drawing showing details of bail connected to analog joystick.

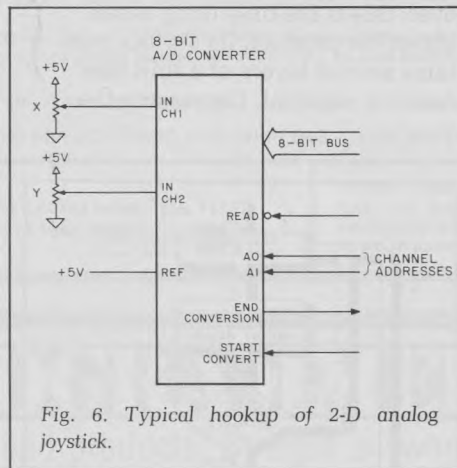


Fig. 6. Typical hookup of 2-D analog joystick.

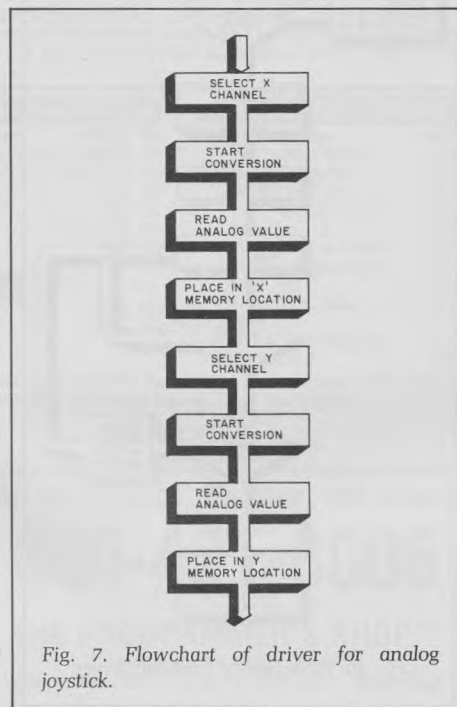


Fig. 7. Flowchart of driver for analog joystick.

will be taken with no result unless the just-read state differs from the previously stored initial sample. Now several things can be decided. The first and most obvious piece of information acquired is the direction in which the ball is traveling. The first phase signal to change will indicate the leading pulse if the change was from a no-signal to signal posture. Realize that the initial state could have shown the lagging hole in the fixed position. Therefore, before the program goes off calculating, a test such as this should be performed.

The next information that is determined is the speed of the ball. If the program marks the first no-signal to signal transition and counts time until the next subsequent transition, a period may be established. From here, the program simply notifies the supervisory program by indicating direction and rate in their appropriate memory locations. As you can see, the algorithm is complex but not overwhelming.

## Mouse

Believe it or not, the latest fad among input devices centers around the small fur-covered thing not welcome around the house. The mouse as a PED, however, is somewhat more friendly. In fact, some researchers claim it's the most user friendly of all input devices.

Several styles of mouse are available. A black mouse, manufactured by Radio Shack, is for use with its Color Computer. As mouse standards go, this one is somewhat unique as it emulates Radio Shack's standard resistive joystick for compatibility. Interfacing to the mouse is the same as it would be for any analog joystick.

Another mouse bears little resemblance electrically to the Radio Shack model. Manufactured by Hawley, it has become the industrial standard. It does, however, conform exactly to the output specifications outlined for the trackball. Basically, a mouse is an inverted trackball with some extra buttons on top.



Interfacing can be accomplished exactly as indicated earlier.

I've discussed most of the small portable position entry devices that are used today mainly where low cost and small operating space are required. You'll notice when it comes to interfacing that PEDs generally fall into two categories, digital and analog. As I move into the higher end of input devices, these two categories remain the same with one difference. The digital-interfaced units tend to incorporate more intelligence within the PED.

## Tablets

Ever since man developed the ability to use writing instruments, he's felt most comfortable with a pencil and pad of paper. Some time ago, computer-peripheral manufacturers developed an input device that looks like a pen and a paper pad. The operating sequence was a natural for anybody used to using a pencil and the tablet was born.

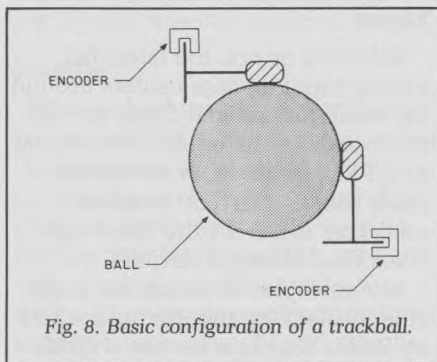


Fig. 8. Basic configuration of a trackball.

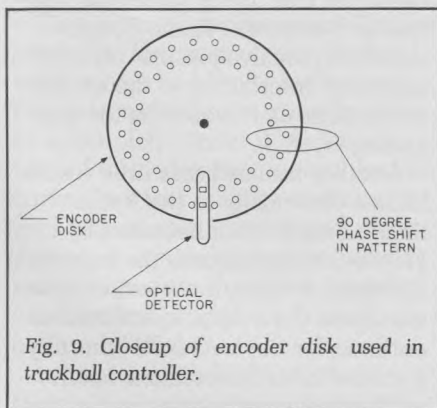


Fig. 9. Closeup of encoder disk used in trackball controller.

Today several varieties and sizes of tablets are on the market. Their operating principles are as varied as the product offerings. I'll introduce you to two available products that are within the economic reach of many microcomputerists. The first is the somewhat famous Koala Pad from Koala Technologies.

Hardly a magazine crosses my desk that doesn't contain at least one ad or product review of this minitab. I say "mini" because the writing surface is somewhat smaller than the letter-sized standard. However, this is the only thing small about the product. Its surface contains several layers of a thin film-resistive material. Depressing the

supplied stylus on this surface outputs a variable x-y resistive signal that emulates standard analog joysticks. Once again, here's a performance product that can be retrofitted into existing interface designs.

It boasts resolution of  $256 \times 256$ , but if you're designing the analog interface, you can choose the resolution by simply picking the number of bits in the analog converter. The unit that I've evaluated was made for the IBM PC so there may be some interface differences between that and one made for other computers.

Tablets are sometimes referred to as digitizers, and the second model conforms more toward the industrial standards. It's the GT-116 tablet from Radio Shack, a complete tablet with stylus. It allows single sheets of  $8\frac{1}{2} \times 11$ -inch paper to be placed on its writing surface. The pen stylus contains an ink cartridge that will make the user feel "write" at home.

Its operation differs significantly

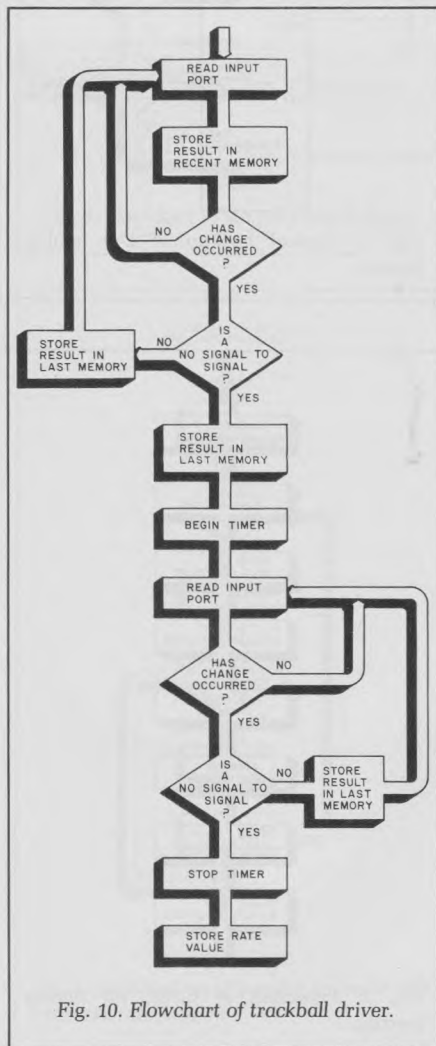


Fig. 10. Flowchart of trackball driver.

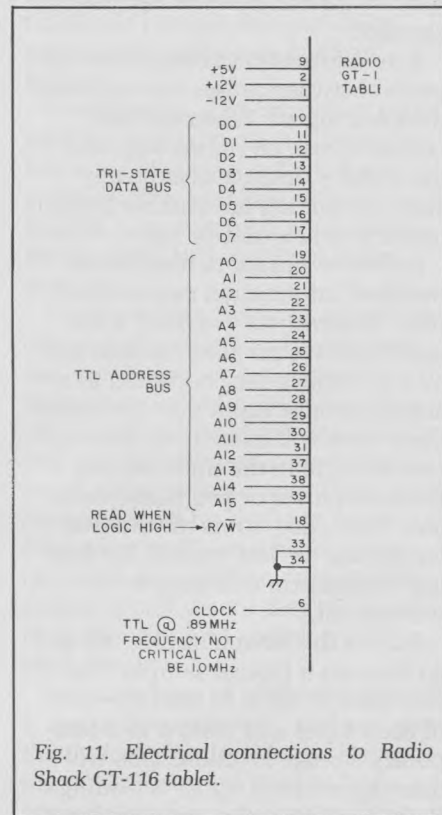


Fig. 11. Electrical connections to Radio Shack GT-116 tablet.

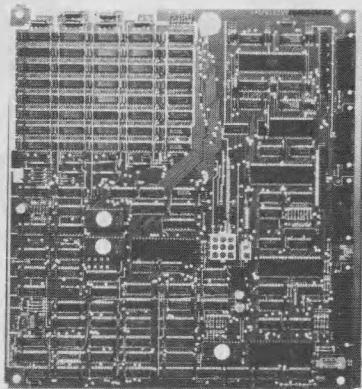
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from the Koala Pad. Ultrasonic signals emitted from coils embedded in the tablet bed are picked up by a sensitive coil in the stylus. Depending on the phase relationship of the signals, circuitry on board determines the x-y locations. Notice I made mention of on-board circuitry. This tablet is fully ready to interface

to a standard microcomputer.

Radio Shack originally intended to market this device for use with its Color Computer; however, it's a relatively simple task to interface it to other systems. All that's needed is to purchase the correct connector (generally available) and to obtain the technical specs (provided here).

## Product Information

### Joysticks

Atari 2600 Joystick, Atari Corp.

Color Computer Joystick #26-3008, Radio Shack

### Trackballs

Atari Model CX22, Atari Corp.

Accuball Controller, Accu Corp.

### Mouse

Color Mouse #26-3025, Radio Shack

Hawley Mouse #X063X, Mouse House

### Tablet

Koala Pad, Koala Technologies

Color Graphic Tablet GT-116 #25-1196, Radio Shack

### Suppliers

Accu Corp.

430 Ferguson Drive, Bldg. 3  
Mountain View, CA 94043

Koala Technologies

3100 Patrick Henry Drive  
Santa Clara, CA 95050

Atari Corp.

1312 Crossman Ave.  
PO Box 61657  
Sunnyvale, CA 94086

Radio Shack

Tandy Corp.  
1400 One Tandy Center  
Fort Worth, TX 76102

The Mouse House  
Berkeley, CA 94710

With these in mind, let's explore interfacing a tablet.

The GT-116 performs all the digitizing for you. Its resolution provides 256 horizontal points by 192 vertical points plus a border area around all four sides. This border can be used for menu selection. The interface board that comes with it requires a +5V, a +12V and -12V power supply. Electrically, the unit resembles the connection diagram shown in Fig. 11.

From the figure you can see that an eight-bit bus provides the data from the tablet. There are three addresses within the unit where the data exists. They are the following:

FF60 = x

FF61 = y

FF62 = Pen Status

The x data will be the current x position as a range from 00 to FF. The y location represents the current y position from 00 to BF. The pen status reflects 16 possible conditions of the pen. The status and the code provided for it is shown in Table 1.

As you can see, numerous possibilities exist. The terminology "pen down" means that the ink cartridge within the stylus has been pressed to the tablet surface enough to operate a tiny switch within the pen. The display area corresponds to the main tablet face.

Interfacing the tablet requires a 40-pin edge connector that's sold in many stores. It conforms to the ribbon cable standard of .1 inch spacing between conductors. You'll notice on the interconnect diagram in Fig. 11 that the connection of the tablet is relatively straightforward.

## Conclusion

Well, there you have it. This is not an exhaustive look at all the possible PEDs; however, I hope it'll serve to introduce you to some that were unfamiliar. □

Mark Robillard, an independent consultant, may be contacted at MJR Digital, PO Box 630, Townsend, MA 01469.

Status Code	Description
00	Pen not down, out of range of pad.
01	Pen down, off pad.
02	Pen within one inch of surface.
03	Pen down on display area or on bottom margin.
04	Pen not within one inch of x margin (right or left).
05	Pen down on x margin.
06	Pen on x margin but not down.
07	Pen down on x margin.
08	Pen not within one inch of y margin (top margin).
09	Pen down on y margin.
0A	Pen within one inch of top y margin.
0B	Pen down on top y margin.
0C	x and y margin.
0C	x and y margin and pen down.
0D	Pen on upper left or upper right x-y corner.
0E	Pen on upper left or upper right x-y corner and pen down.

Table 1. Pen status and code.

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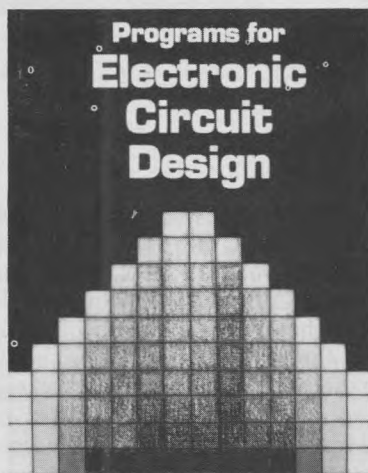
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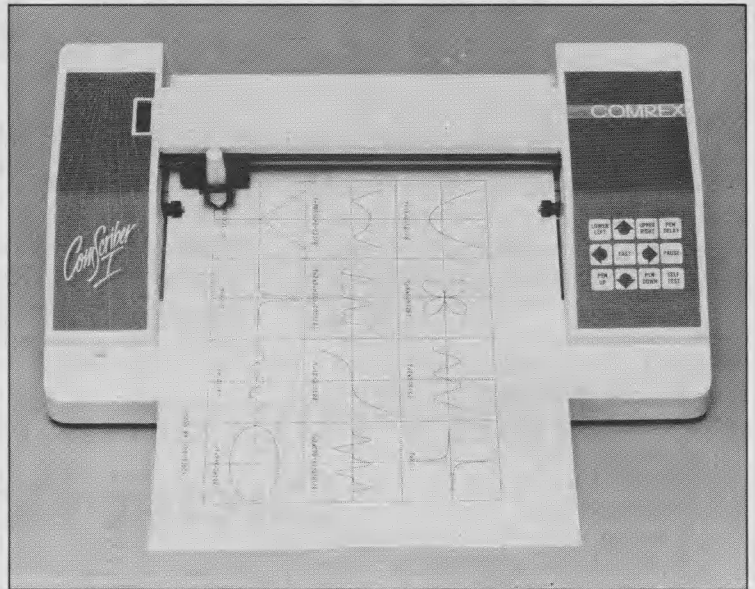
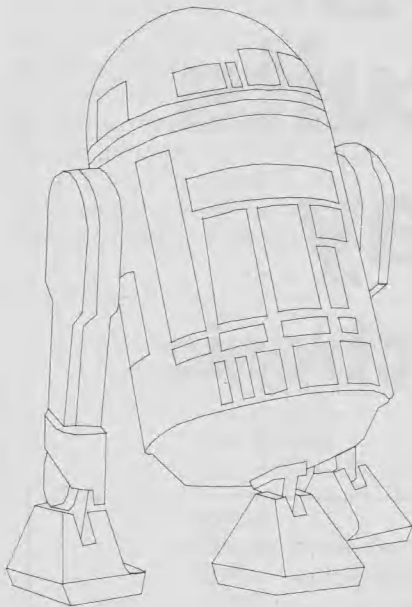
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# ComScriber I:



**Y**ou occasionally need a bar graph or pie chart for a report. You have a printer but, for one reason or another, its graphing abilities just don't cut it. You need an inexpensive plotter, one that produces good results but doesn't cost more than the computer it's attached to.

You may want to consider Comrex International's ComScriber I, a one-pen plotter that boasts respectable resolution and speed (four thousandths of an inch, six inches per second). The ComScriber I has been around for a while and, at \$795, has been considered a good value.

Now it's an even better value. Comrex recently lowered the price to \$495 and, realizing that people who buy inexpensive plotters don't want to buy expensive graphics programs to drive them, threw in a graphics package called KeyChart.

Taken singly, neither package nor software is especially thrilling. Put together, however, they make an effective and affordable light-duty graphing system.

## First, the Plotter

The photo shows the plotter. The grip wheels, sandpaper-and-rubber

affairs located on opposite sides of the platen, hold the paper in place and also move it on its x,y axis (up and down). Although the wheels look chintzy, they do a good job of positioning the paper. I did notice, however, that the paper tends to skew ever so slightly when the plotter is printing, especially with complex charts requiring a lot of paper movement.

The pen holder is mounted on two metal rods and moves from left to right. The plotter's 12-key keypad lets you position the paper, raise and lower the pen, increase the pen speed and print a test plot.

The ComScriber I communicates with your computer using a parallel interface. When you buy the plotter, you also buy what's called a support kit—the cable and demonstration disk appropriate for your computer, along with paper, documentation and red, blue, green and black pens. Setting up the unit is a matter of plugging the cables in and inserting a pen.

## The Plot Thickens

The plotter's physical plotting area encompasses 2500 units along the x axis and 1838 units along the y axis, with the home position (coordinates

0,0) located at the bottom right-hand corner of the paper. The unit's memory extends beyond that area, however, to 32,768 units along both axes. This means that you could, in theory at least, store a large drawing in the unit's memory and plot it in sections. It also means you can use a roll of paper to plot drawings up to 121 inches long along the x axis.

The ComScriber responds to a set of 19 two-character commands. The PU command, for example, lifts the pen from the paper, while PD puts it back down. Similarly, AX draws an x axis and AY draws a y axis.

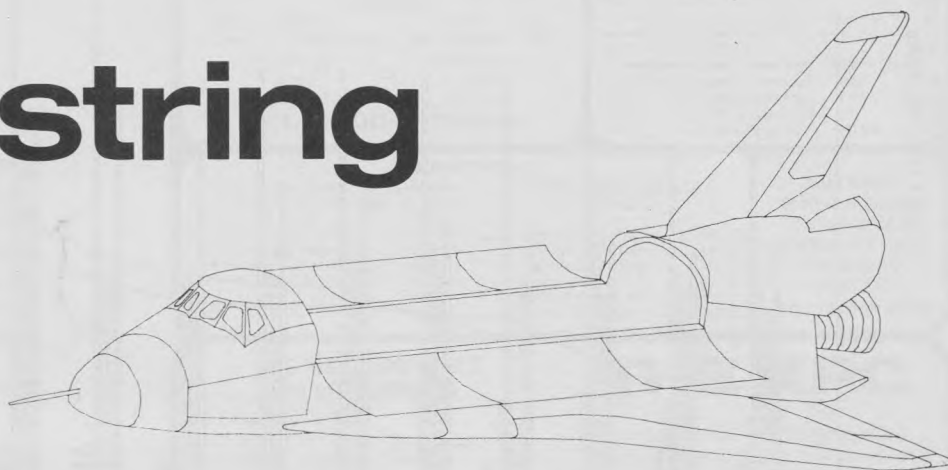
You can control the plotter through Basic using the LPrint statement, but it's a laborious process. Plotting a simple line graph with titles on both axes requires 20 or so lines of code containing the very unreadable combination of two-character commands followed by coordinates.

## Documentation

ComScriber's documentation comprises a 40-or-so-page, spiral-bound, attractively designed manual and a tutorial and demonstration disk. The manual is a model of clarity and thoroughness; it covers everything

# Plotting On a Shoestring

By Jim Heid  
Senior Technical Editor



from setting up the plotter to creating complex graphs using Basic. It's riddled with close-up photographs that show you how to install pens and such and with figures that illustrate the effects of each command.

The demonstration disk contains a menu-driven program that lets you print various example plots, including a space shuttle and an R2D2-like robot. The disk also holds a tutorial program that's supposed to teach you how to control the plotter through Basic. The tutorial draws a graph on the screen; as each portion is drawn, the program line that drew it is displayed, showing you the commands involved in drawing that portion of the graph. It won't have you spewing out pie charts in minutes but, combined with the manual's tutorial information, it'll give you an idea of what's involved in producing a graph. (It convinced me to stick with KeyChart.)

## Now, the Software

KeyChart is a product of Canada-based SoftKey Software Products. Currently available in MS DOS, Epson QX-10, Osborne and Kaypro formats, the package comprises a copy-pro-

tected program disk, a disk containing sample charts and an 83-page manual.

Keychart is an easy-to-use, menu-driven program that produces bar, line and pie charts. The software supports up to 64 variables and 99 observations for each variable. Actually, however, the number of observations you're allowed depends on the number of variables you specify and vice versa. You can't specify more than 323 items in total.

Your charts can have up to three horizontal titles, each up to 40 characters long, and one vertical title, which can be up to 37 characters long. You can specify the character size from 1½ to 13½ millimeters high, and you can specify a slant for the titles.

With KeyChart, your chart's legend and observation labels are limited to ten characters each. If ten characters aren't enough, you can use what's called a floating title, which can be printed anywhere on the page. A chart can have up to 64 floating titles (although floating titles are subject to the same memory restrictions as observations and variations), and each can be up to 80 characters long.

Supplying chart data to KeyChart is easy. The program displays data-entry screens containing fields for each item; you move from field to field using the arrow keys. Once a screen is filled out to your satisfaction, you move on to the next one. You can also edit already-stored data in much the same way.

## Features Summary

KeyChart has some noteworthy features. Among them:

- numerous chart types—You can plot line graphs, bar charts (both clustered and stacked variety), combined line and bar charts, pie charts and exploded pie charts. You can change chart types at any time.

- chart preview—You can view your chart on the screen before plotting it. Two types of preview are available: a full-sized preview and a page-layout preview that you can use when combining several charts on a single piece of paper. IBM PC owners must have a graphics board to fully use the preview feature.

- Epson printer support—You can dump any KeyChart screen (including a graph preview) to any FX-, RX- or MX-series Epson printer.



# WORLD POTASH PRODUCTION

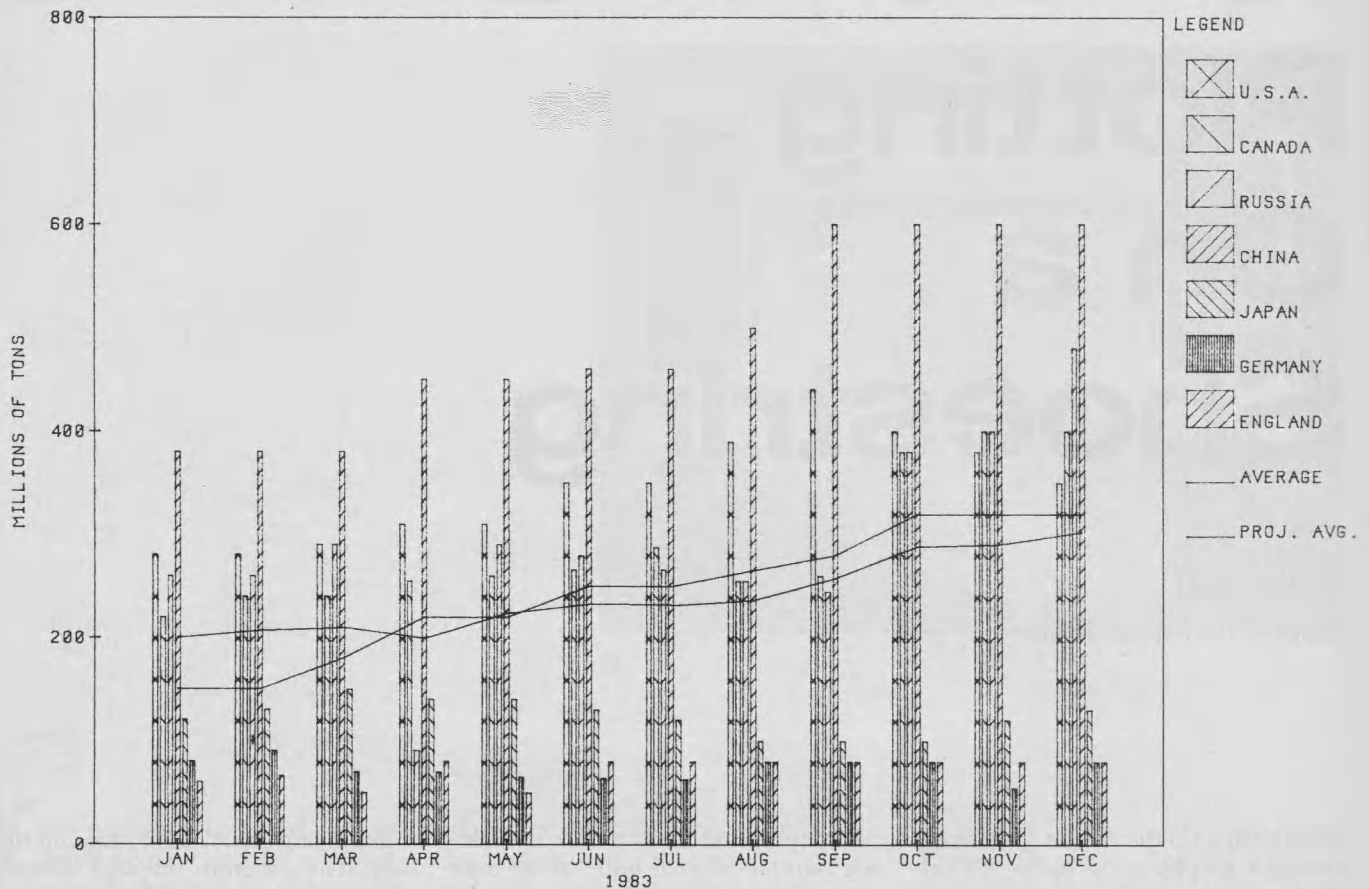


Fig. 1. More than you'd ever want to know about world potash production, drawn by KeyChart/ComScriber in ten minutes, 45 seconds.

- data import—KeyChart can accept data from a number of spreadsheet programs, including 1-2-3, MultiPlan, SuperCalc and PerfectCalc. You can also create organizational charts and text charts using any word processor that creates ASCII files.

- adjustable pen speed—You can specify three pen speeds: paper speed (the fastest), transparency speed (slower) and extra slow speed, which the manual says you can use to stretch the life of your pens.

- automatic scaling with manual override—KeyChart will automatically scale your chart based on the range of data in it, or you can specify your own scaling.

## Some Small Problems

KeyChart lets you use names of up to 30 characters when storing your charts. The program uses an index file to store your long filenames next

to the DOS filenames it gives your charts—names like CHT101, CHT102 and so on.

This technique has one big drawback, however: if you accidentally delete or otherwise lose the index file, KeyChart won't be able to find your charts. Unless you can recreate the datafile with a Basic program—and that assumes you know how the file was set up to begin with—KeyChart won't acknowledge any of the charts on the disk.

I found a small but potentially confusing bug in one of KeyChart's data entry screens. When you finish editing a screen, a yes/no prompt at the bottom of the screen asks if you're finished with that screen. If you press the return key instead of Y or N, the screen scrolls one line and the cursor moves back to the first field in the screen. Since the screen scrolled, the display formatting gets jumbled and

it becomes hard to determine where you are. The bug won't destroy any data, but it could confuse a less experienced user.

I informed SoftKey Software of the bug; they responded by expressing a corrected version of the program. (Apparently, the bug was caused by a missing semicolon in the program's compiled Basic source code.) If you already own the IBM PC version of the program, contact SoftKey Software about obtaining a corrected disk.

## Documentation

Attractively designed, printed on sturdy paper and packaged in a three-ring binder, KeyChart's manual looks a little better than it reads. All the necessary information you need to use KeyChart is there, but its style is dry and a little awkward, and its lack of an index makes a quick reference



difficult. Fortunately, KeyChart is easy enough to use that you probably won't have to refer to the manual very often. I would, however, like to see an expanded tutorial on presentation graphics, since people who buy this system are probably newcomers to the subject.

### Conclusion

The ComScriber I/KeyChart combination makes an effective light-duty graphing and plotting system. You can find a faster plotter than the ComScriber I (indeed, it'd be hard to find a slower one), and you can get graphics software that'll draw circles around KeyChart. But you won't find them both for \$495. This package is the best value around in presentation graphics.■

## Comrex Comscriber I and KeyChart, version 1.2

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Comrex International  
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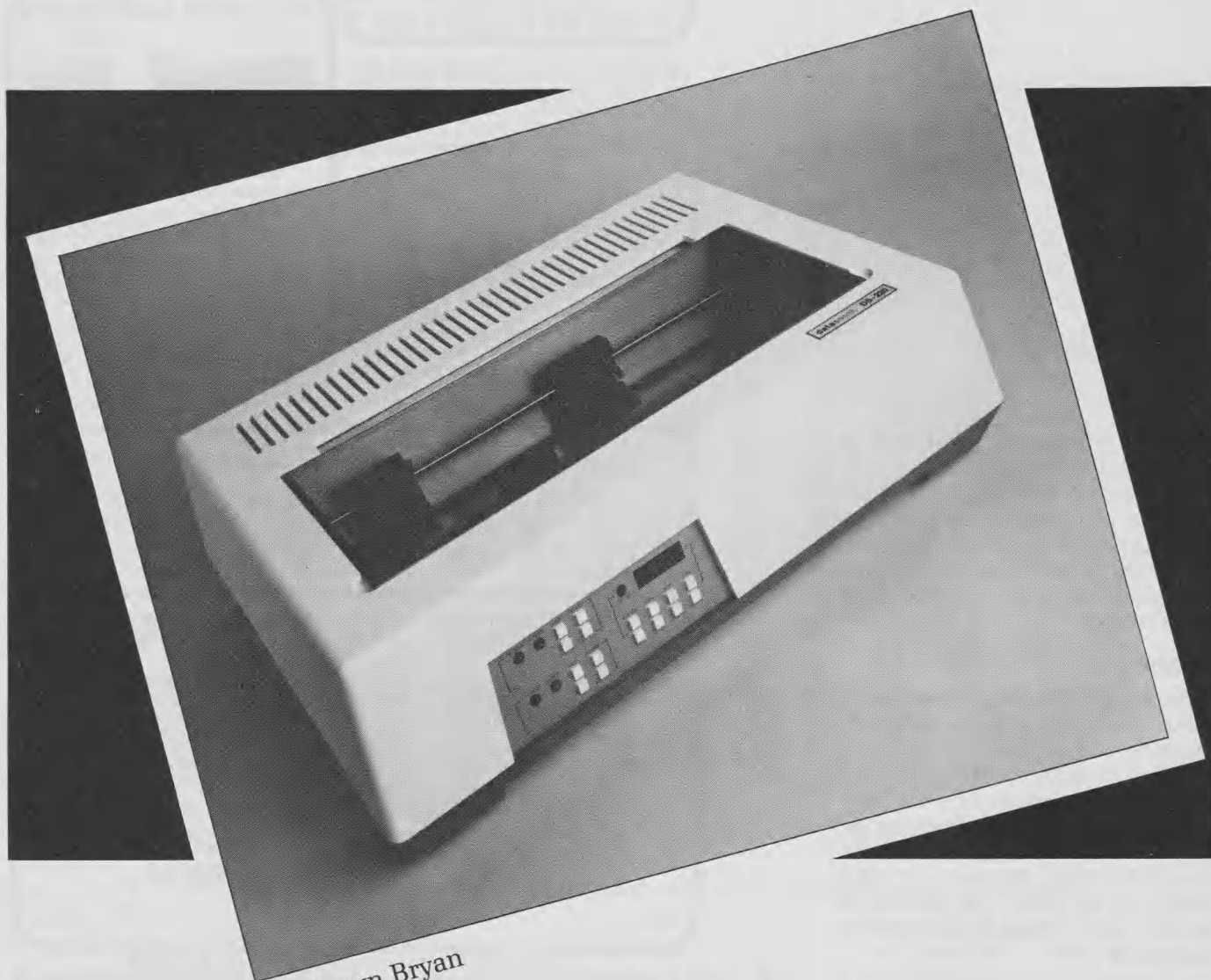
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By Shawn Bryan

# Datascouth's Do-It-All Dynamo

If you have long searched for the printer that can do just about everything, your search is over. Datasouth has released the DS-220, a multimode dot-matrix printer that rivals anything on the market feature for feature. I normally don't rave about a product like this, but I'm very impressed with both the printer and the people who back it up. Toll-free help lines, friendly and knowledgeable assistance and a well-designed product make heaping praise on the DS-220 all too easy.

### Unique Keyboard

The first thing that strikes you about this printer is the unique Datasouth keypad. It's imposing at first. There is the LED display that exhibits mysterious numbers, the meaning of which is hidden in codes found in the manual. There are no platen knobs for paper adjustment, no familiar dip switches. Everything is controlled by this panel.

The Datasouth printers have taken a step forward in printer technology, in my opinion, by doing away with switches buried in the innards of the machine. What you do have is a panel that permits full programming of the Datasouth without ever leaving your chair.

All the options available on this printer are accessible from this panel. Fonts, print speed and style, and spacing are all programmable. Communications interfacing is also controlled here. The Datasouth includes an RS-232C and a Centronics parallel interface. Communications with almost any data processing system is possible.

The DS-220 has eight standard fonts and pitches available in ROM. Additional fonts will be available from Datasouth for special applications, such as bar code and OCR characters. The seven resident international character sets include U.S. and U.K. ASCII and German, French, Swedish/Finnish, Norwegian/Danish and Greek. The Datasouth-220 can also emulate an Epson MX-80 Graph-ics printer or the popular DS-180.

---

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### Print Speeds

The DS-220 has three different print speeds. The high-speed draft mode prints at an advertised 220 characters per second (cps). The so-called memo-quality mode prints at 90 cps and the near-letter-quality mode prints at 40 cps. A nine×seven matrix is used to form the characters in the draft mode, a nine×15 matrix is used in the memo mode and an 18×48 matrix is used in the near-letter-quality mode.

The near-letter-quality mode is the closest thing I've seen on a dot-matrix printer to full letter quality. The DS-220 uses a nine-wire print head to form the characters and, in the NLQ mode, the paper is shifted for a second

### Speed Comparisons: Datasouth, Qantex and Epson

The advertised and observed speeds of printers are two different measurements. The advertised speed is the flat-out print speed in characters per second (cps). No carriage returns or tabs or other normal printing chores are included in the cps claims. The observed speeds listed here are the result of printing a full page of single-spaced text consisting of 2820 characters, tabs, line feeds and so on. In other words, a normal piece of typing work.

The speeds here are considerably slower than the speeds advertised for each of the printers because of the work being done by the printer in addition to simply putting characters on paper. This isn't meant to be an indictment of the printer manufacturers. It simply gives you another basis for comparison. The percent of claimed figure column tells you how much degradation of speed occurred during normal printing. The higher this number, the better the printer is at maintaining its performance under load.

	DS-220	Qantex 7065	Epson
Claimed draft speed	220	300	80
Observed speed	152	198	48
Percent of claimed	69%	66%	60%
Claimed NLQ speed	40	62.5	40
Observed speed	37	45	27
Percent of claimed	92.5%	72%	68%

Table 1. Speed comparisons. All speeds are measured in characters per second.



pass by the print head. The resulting characters are fully formed with no distinguishable dot-matrix pattern. The font design is also pleasing. Letters typed on this printer will not have to apologize for being produced on a dot-matrix machine.

Datasouth uses commercial-grade technology to build its printers. The print head on this machine is a large open-coil magnet. The forms tractors are good beefy affairs that will never break from overuse. The printer has few moving parts. I expect that the mean time between failures for this printer will be good. Should the printer need repairs, many of the parts are easily accessed by removing the cover.

The people at Datasouth are more than capable of talking you through minor repairs right in the office. They will also talk you through the insertion of new ROMs if you decide you

want to add a new character set to your printer. If you live close to a dealer, Datasouth maintains high standards for its dealers and expects them to be competent in most phases of printer repair.

The Datasouth is distributed through a closed network, and Datasouth keeps a tight rein on its dealers. The result is that fewer dealers carry the Datasouth, but those who do are well-qualified by the company.

### Performance

The DS-220 has a nonvolatile memory where your default settings are stored for printer start-up. You may change the way this printer powers up any time you want by simply saving the new defaults into this memory. The Datasouth also has a 2000-character buffer. This is somewhat limited for a printer with the speed and capability of this one. I asked the

people at Datasouth if additional memory could be added to the machine. For now, that's not in the plans.

The Datasouth accepts paper from both the front and bottom. Because the tractor has pinch rollers built into it, feeding letterhead paper into the Datasouth is no problem. I've run a number of letters through this machine and found that the paper lines up perfectly every time. Tractor-feed paper is also handled smoothly and paper jams are a rarity.

If the paper does jam, the Datasouth will sense it and send a code to your computer to stop printing. The Datasouth uses a light sensor for the paper-out detector. There are no micro switches to jam. The only disadvantage to the light sensor is that extremely thin paper in a very brightly lit room may not trip the paper-out sensor. In that case, you'll have to darken the room, cover the sensor, or disable the paper-out function to get the printer to work.

The only other drawback to this printer is that it's loud. It's probably the noisiest printer I've ever run. I spoke with the people at Datasouth about this, too, and they assured me that they're working on a solution to the problem. The model of the printer that I have for review has no sound-proofing whatever. Adding some foam padding to the interior would go a long way toward solving the noise problem, so I expect that Datasouth will make corrections to this problem very quickly.

The tables with this review give you an overview of the speed and capabilities of this printer. It clearly has features that no other printer in its price range can offer. As a postscript, I liked the printer so much I bought one for my own office. I have an opportunity to review all kinds of equipment in the course of my review work, and I found this to be the best printer I've seen yet. I can't think of a better endorsement for a fine machine. ■

Address correspondence to Shawn Bryan, Datatek, Montpelier Junction, Box 4500, Montpelier, VT 05602.

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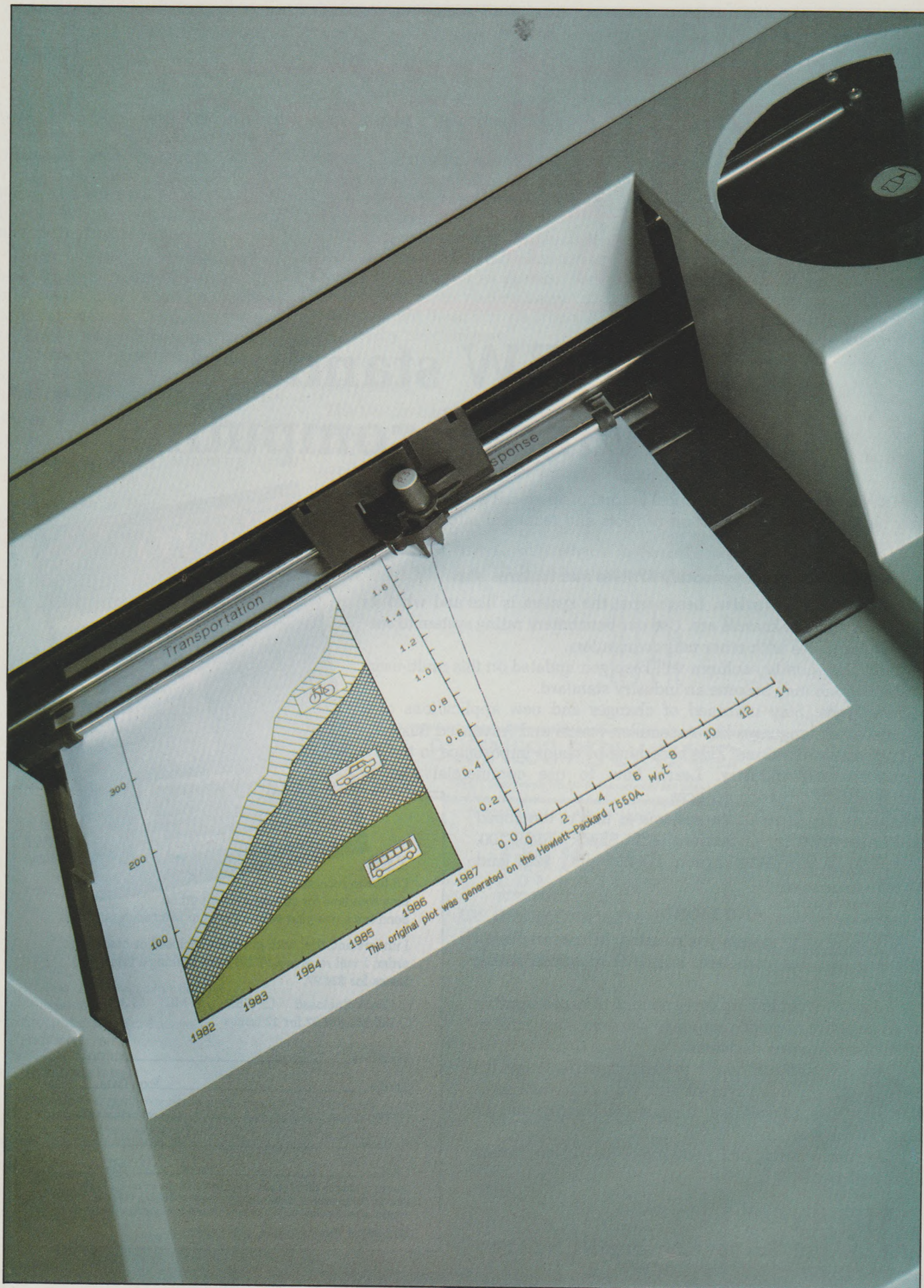
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# The HP-7500: The Fastest Plotter In The...

By Shawn Bryan

*The Hewlett-Packard 7550 is a marvel of technology. Its blinding speed and innumerable graphing options put it in a class of its own. However, if your plotting needs aren't quite that demanding, HP has still got you covered. The 7475A is slow compared to the 7550, but fast compared to everything else. Shawn Bryan tested out both machines, and this is his "Tale of Two Plotters."*

**T**he next time you're at a loss for words, try a picture. Graphics via computers is easier and easier to come by, especially with the advent of sophisticated graphics software and plotters.

Hewlett-Packard has long been a recognized leader in the production of instruments for the lab and for engineering applications. Now, that experience has been put to work creating machinery we microcomputer owners can use to make our little machines put out graphics even the big boys will envy.

This is a tale of two plotters. One has been around awhile; the other is brand new. The new one, the HP-7550, is a brute of a machine that offers a plethora of graphing options. The other, the 7475A, is a well-designed workhorse with many of the same specifications but without the fancy accoutrements of the larger machine.

## Like and Unlike

First, the similarities: Both machines use the same interfaces; both work with the same computers; and

both use the same language (although the 7550 has more commands because of the additional features it offers).

The differences between the machines are more interesting because the market direction of the two is clearly different. The HP-7550 is larger, faster and more expensive. The 7475 is quieter, slower and less versatile. Both machines reflect thoughtful design, and both are Cadillacs in a world of Ford plotters.

## Good Performance

The HP-7475A is a six-pen plotter designed for the smaller business or for the department or division manager. It creates quality graphs with a resolution of .001 inches on a variety of mediums. The six pens are held in a carousel. The plotter selects the appropriate pen from this carousel as it prepares a drawing.

Plotting is accomplished by moving the pen on the horizontal axis while moving the paper vertically. The paper is held between two pinch rollers, one with a sandpaper-like surface. The computer moves the paper by moving the rollers. Compared to the speed of the 7550, the 7475 seems lethargic. But when compared to



**For more demanding graphics applications in a production environment, the 7550 is the plotter of choice. . . It's hard to have an appreciation of this plotter's speed, but it plots at 32 inches per second and accelerates at six g's.**

most other plotters I've used, the 7475 seems like a speed demon.

Perspective is important. While a plot on the 7475 may take almost twice as long as on the 7550, the same plots on a bed plotter I've used in the past would take twice as long as the 7475. Finally, the same plots created by a secretary or draftsman by hand could take hours, not minutes.

One of the nicest things about the 7475 is that it's silent. There are no fans or other motors whirring. When it's actually plotting, the 7475 isn't unpleasantly loud, although the pen

transport mechanism does clatter a bit. The 7475 is also compact and light. It weighs roughly 16 pounds, and you can easily move it about the office if you want to use the plotter in two or three locations.

The control panel on the 7475 is up front and easily accessible. If you wish to digitize a drawing, the 7475 supports software that permits digitizing. The 7475 plots on 8½ by 11-inch paper of 11 by 17-inch paper.

A great deal has been written in the past months about the coming of age of graphics programs, but very little

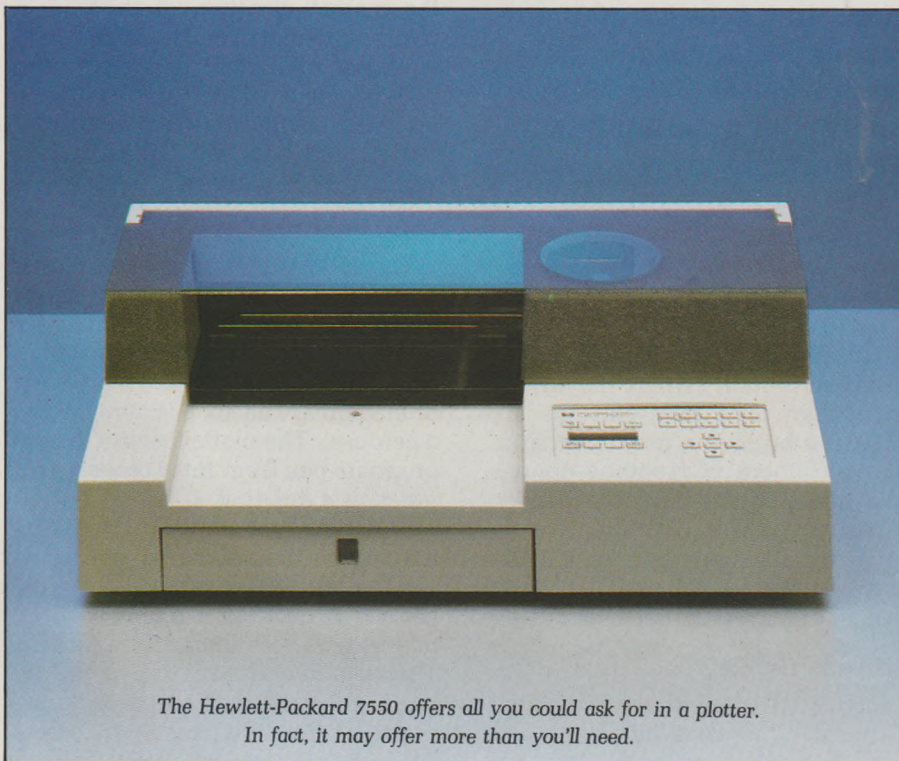
has appeared about putting those graphs on paper. The 7475 is a capable performer that costs \$1895. If that seems expensive, stop to think how much you spend in salaries if all your charts are prepared by hand now. I think the 7475 is a fine machine and I recommend it highly.

#### **Meets Greater Demands**

For more demanding graphics applications in a production environment, the 7550 is the plotter of choice. It's new, so new the unit I used still had no FCC certification and was clearly marked as a demo unit. It's also a marvel of technology. All the things the 7475 can do, the 7550 can do better—well, maybe not better, but faster. It's hard to have an appreciation of this plotter's speed, but it plots at 32 inches per second and accelerates at six g's. That's the same as traversing a football field in a minute and 52 seconds, or running at two miles per hour—not fast for a sprinter, but plenty fast for a plotter whose goal in life is basically to sprint around 8½ by 11-inch paper, not a football field.

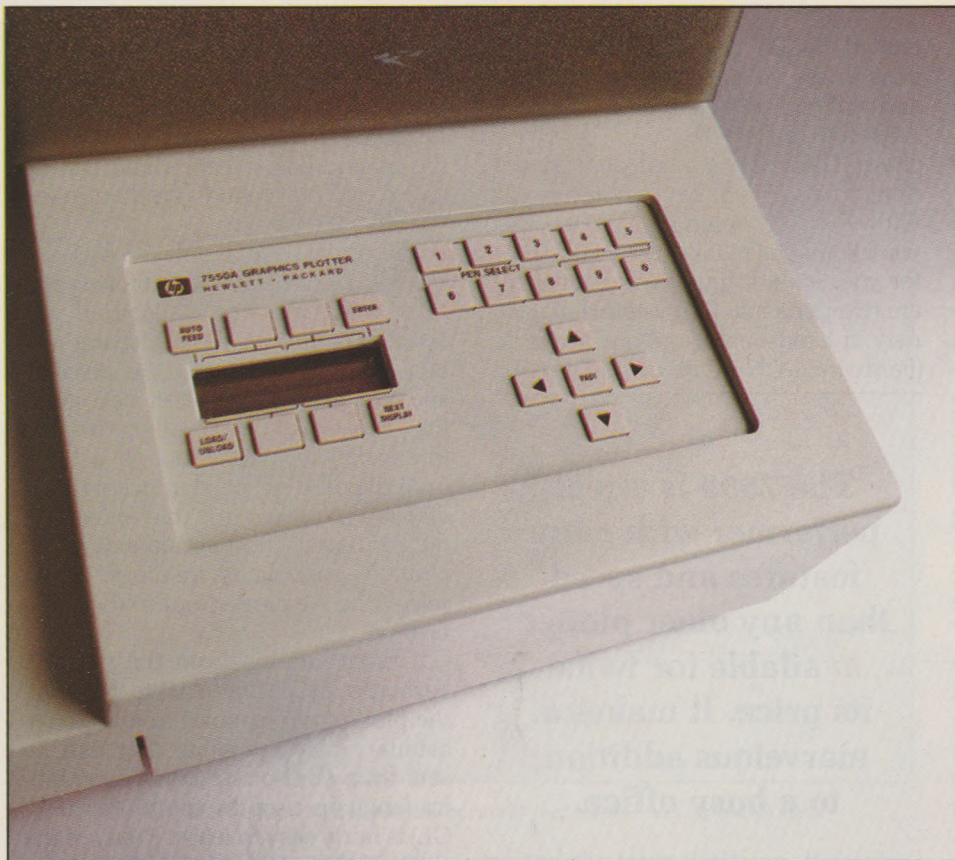
Even more impressive is the acceleration figure, since the real speed of a plotter is hidden there, not in the drafting speed. For those who have forgotten their high school physics, acceleration is measured in feet per second (fps) squared. One g is 32 fps squared. Six g's is 192 fps squared.

It's similar to the g forces experienced by fighter pilots in high performance aircraft. At six g's, a 200-pound person weighs the equivalent of 1200



*The Hewlett-Packard 7550 offers all you could ask for in a plotter. In fact, it may offer more than you'll need.*





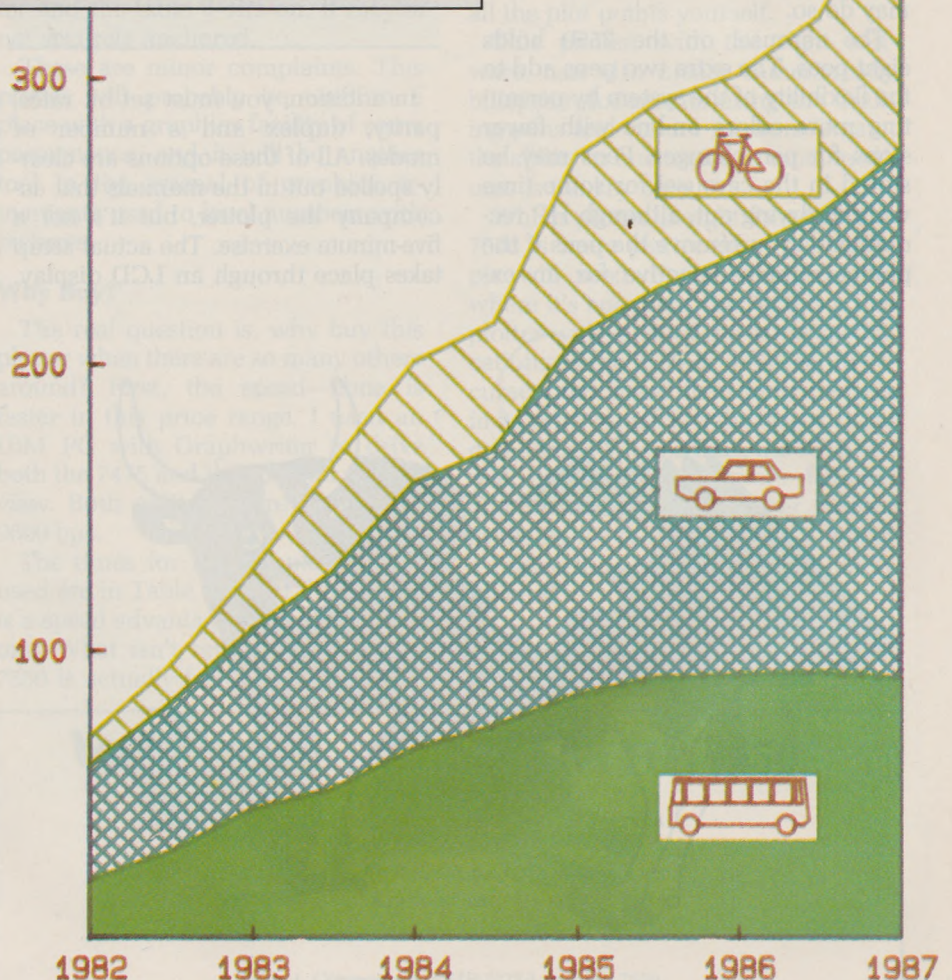
The 7550's keypad (left) includes an LCD and control keys for paper loading and pen movement. Below and on the following page are examples of plots done by the HP-7550.

pounds. At six g's, the pen in the plotter, which weighs a few grams, suddenly takes on the characteristics of something much heavier. The energy required to start and stop the pen and its holder quickly and accurately is immense.

The plotter begins to run into the laws of physics: mass and inertia make moving the pen this fast a real feat. Building a plotter that can go much faster than this one may require a new technology. In charts with a lot of titles, acceleration is what makes a plotter shine. The short strokes required to form labels demand more from a plotter than the long lines, where a pen gets up to speed and stays there for some time before slowing down. Since the plotter normally does more of the short strokes than the long lines, acceleration is a key ingredient to speed.

#### Other Features

The 7550 has some other features that make it even more inviting for the production environment. The first is an automatic sheet feeder. This device allows you to load up to 150 sheets of 8½ by 11-inch paper and plot away with no manual paper changing. If you have a software





program that can capitalize on this feature, you can set up a batch processing facility where your charts are loaded into the software, and you go off for coffee while the plotter zips through the graphics, one after the other.

The 7550 also offers a number of plotting options. You can use felt-tip pens or ballpoint pens. You can also use drafting pens and transparency pens. The force with which the pen presses on the paper is software-controlled, as are the speed and acceleration.

For every plotting medium, there is an optimum setting that makes the best drawing. Transparencies, for example, require a slower pen speed to make sure the colors are fully filled in. Paper, on the other hand, must be plotted at higher speeds to prevent ink bleed. The plotter automatically knows the kinds of pens you're using by the carousel you load and optimizes the pen speeds and drawing force for that kind of pen. If you want to change the default selections, you may do so.

The carousel on the 7550 holds eight pens. The extra two pens add to the flexibility of the system by permitting more colors on-line with fewer stops for pen changes. Pens may be stored in the carousel for some time without drying out, although HP recommends you remove the pens if the plotter remains inactive for an ex-

tended period of time. I've left the pens in my 7475 for weeks at a time and suffered no apparent ill effects.

Setting up the 7550 is a bit of a chore. There are so many possible options that, if you're uncomfortable with RS-232C interfacing, you may want someone to take care of this part for you. It's not impossible, but there are two ports into the system and a variety of handshaking options available (hardwire, XON/XOFF or ENQ/ACK).

**The 7550 is a real performer with more features and speed than any other plotter available for twice its price. It makes a marvelous addition to a busy office.**

In addition, you must set bit rates, parity, duplex and a number of modes. All of these options are clearly spelled out in the manuals that accompany the plotter, but it's not a five-minute exercise. The actual setup takes place through an LCD display.

The keypad on the 7550 includes control keys for the LCD display and control keys for paper loading and pen movement. The keypad is laid out nicely, and pen selection and pen up and down commands are controlled from here, too.

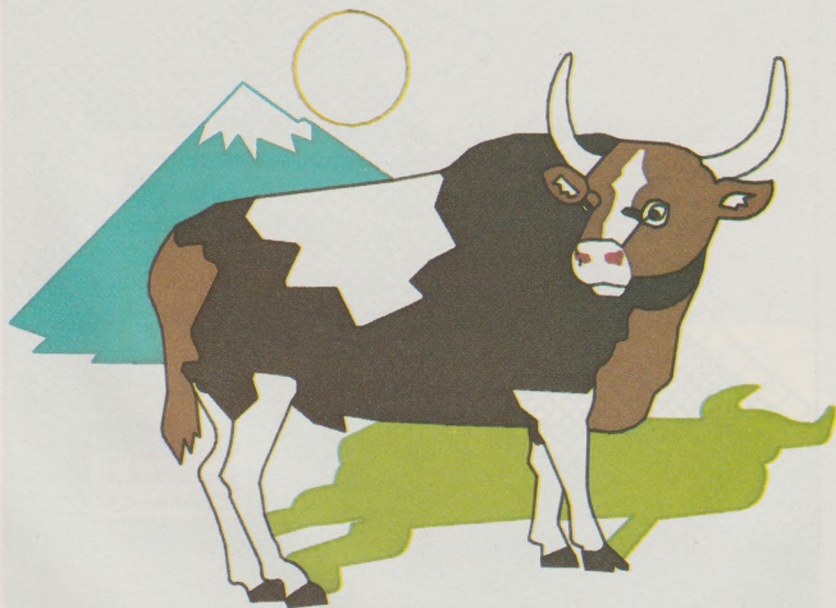
The actual setup involves a series of menus. The LCD display informs you of what options are available. If you select bit rate, for example, the system presents you with the possible speeds used by the plotter. You select the proper speed by scrolling through the available options, one at a time, until the desired speed appears in the display. A press of the enter key makes the selection permanent in the plotter's nonvolatile memory. Other selections are carried out in the same fashion.

If programming from the plotter's keyboard isn't comfortable for you, the plotter will respond to a large vocabulary of commands that can be sent from your computer. The graphics language used by the plotter (HP-GL) is fairly easy to learn. Many of the commands are mnemonic. For example, PU and PD are the instructions for pen up and pen down. CI directs the plotter to draw a circle.

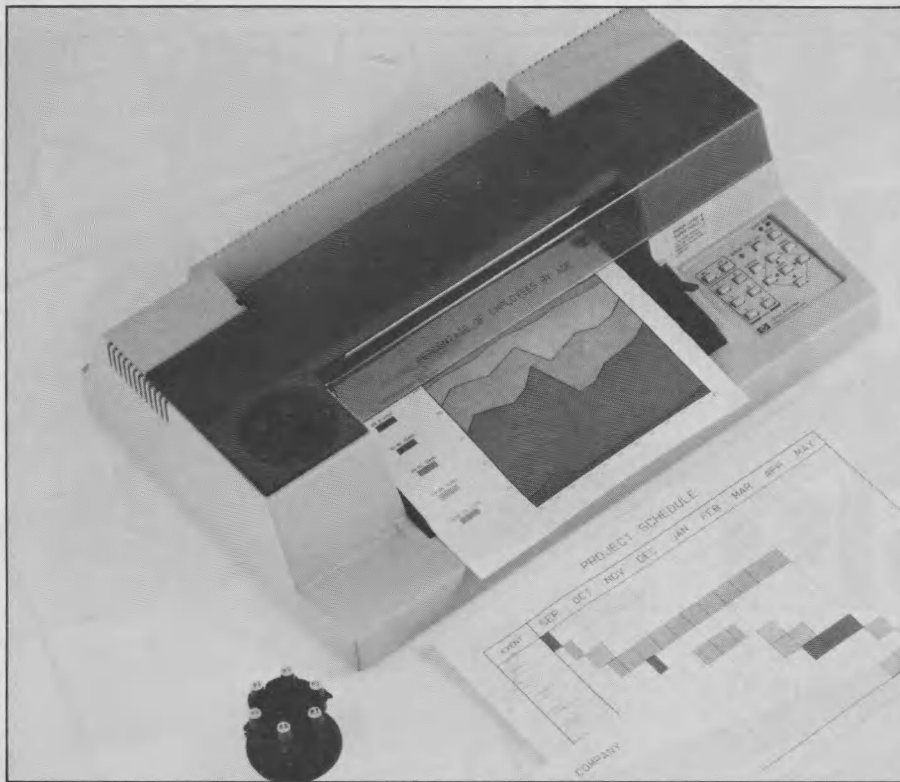
Most graphics software supports the use of HP-GL. It's the default language for many software products. Well-known software like Lotus 1-2-3 supports the HP line of plotters. While this specific plotter may not be listed as supported, the fact that HP has used the same basic language on all its recently introduced plotters means that you can probably plot with it anyway.

I learned this firsthand because my own software library doesn't yet have a package that supports the 7550 directly. I was able to get good results, however, by tricking my software into thinking I had a 7220C plotter. The plotter and software went happily along, oblivious to their supposed incompatibility.

Software that supports this plotter won't be long in coming. Graphic Communications Inc. of Waltham, MA, has released a new version of Graphwriter for this plotter. It supports the paper tray and offers a batch mode so several plots can be loaded to the software at once. This company is one of several that make professional presentation graphics software programs.







The HP-7475A offers more speed and accuracy than comparably priced plotters.

If you purchase this plotter, you should explore this type of software program. There's an art to presentation graphics that isn't required for analytical graphics. Programs written to produce presentation graphics spend more time making sure your graph is well-proportioned and centered on the paper, with titles and footnotes placed properly and in the proper size with respect to the rest of your presentation. You pay an artist to prepare graphics that look good—buy software that does the same.

#### Minor Complaints

What are the drawbacks to this plotter? First and foremost, it's noisy. This plotter has a fan, and from the sound of it, it works pretty hard. The result is a dull roar that may be offensive if you use this plotter in a quiet office or near a telephone. Some sound insulation on this beast would help, but I expect that the fan is always going to be loud.

This plotter is also larger than the 7475. It weighs in at around 55 pounds. Once you have it in place, you won't want to be picking it up and moving it around. You'll also want a fairly steady table. Once the pen starts moving, a fragile table is going to move about a little. The forces required to achieve six g's of acceleration also accelerate the plot-

ter and the table it sits on, if they're not securely anchored.

These are minor complaints. This plotter will probably be used in a place with a graphics facility of some permanence, and it will be another tool in the arsenal of graphics armaments used to level numbers with pictures.

#### Why Buy?

The real question is, why buy this plotter when there are so many others around? First, the speed—none is faster in this price range. I used an IBM PC with Graphwriter to drive both the 7475 and the 7550 for this review. Both plotters were running at 9600 bps.

The times for the sample charts I used are in Table 1. What they reveal is a speed advantage of almost two to one. What isn't revealed is that the 7550 is actually faster than indicated

by the review. The 7550 isn't yet supported directly so I had to plot as if the 7550 was a 7220. It worked, but many of the features of the 7550 weren't used.

The 7550 is actually about twice as fast as the 7475 based upon benchmarks run by HP. That translates into savings of hours over the course of a week in a busy office with lots of graphics chores.

The batch mode is also a real time-saver. You no longer have to wait to load the next sheet of paper in the plotter. You can go about your other tasks and leave the plotter to finish the drawing without you.

So far, I've discussed the plotter as if it were simply a chart master. It has a few other tricks up its sleeve, too. The 7550 can be used to digitize a drawing; that is, trace over the drawing with the 7550 and the plotter will read the coordinates back into your computer (if your software supports such things). You can then reproduce that drawing or scale it or modify it in other ways, without having to enter all the plot points yourself.

This plotter, with the right software, can also create camera-ready blueprint documents using the drafting pens and vellum medium. Again, the ability to customize to most mediums is the key here.

Which plotter is right for you? The 7550 is more plotter than many people will need. For the applications where it's adequate, the 7475 is a fine plotter with most of the same specifications as the 7550. It offers more accuracy and speed than most plotters in its price range. For the larger, more demanding applications, the 7550 is a real performer with more features and speed than any other plotter available for twice its price. It makes a marvelous addition to a busy office. ■

Address correspondence to Shawn Bryan, Datatek, Montpelier Junction, Box 4500, Montpelier, VT 05602.

## Plot Times: HP-7475A vs HP-7550

	Four pie charts with numerous labels.	Bar graph
HP-7475A	10 min. 28 sec.	5 min. 4 sec.
HP-7550	8 min. 48 sec.	3 min. 24 sec.

Table 1. Comparison of HP-7475A and HP-7550.









# Of Printers And Plotters

By Dave Rowell  
Technical Editor

*The printer/plotter business is booming. And as the industry grows, prices are dropping and the technology is becoming more and more sophisticated.*

*Technical Editor Dave Rowell talked with leaders in the field and reports on where the printer/plotter pack is headed.*



If you think the microcomputer industry has a monopoly on fast growth and technical innovation, you haven't looked at the printer and plotter business. Both are growing and changing rapidly.

In 1983, 3.8 million printers were shipped. By 1988, that number will be 13.8 million, according to Dataquest, a California-based market research firm. Existing dot-matrix, daisy-wheel and plotter designs are being fine-tuned for performance. Evolving technologies promising speed and high resolution are finally coming to market, including ink jet, thermal transfer and laser page printers.

All this is exciting, but what should interest you most is that you may be able to afford some of these benefits. Prices are coming down as performance improves.

### Eroding Prices

Printer prices have been falling for some time, but one factor that al-

lowed price drops in the past may be gone. Jim Busby, vice president of marketing for Datasouth Computer Corp., has just returned from a two-week stay in Japan: "The underlying tone over there was that we're starting to bottom out as far as the pure hardware costs go. The cost of electronic components, like microprocessors and memory chips, [is] beginning to go up for the first time in my memory."

Other factors are still working, however, to bring prices lower. Competition is one. According to John Hoper, vice president of the peripherals group at Future Computing Inc., "The price points are now pretty well-covered," but there will be "continuing price pressure."

Ajit Kapoor of Dataquest's Electric Printers Industry Service cites two other factors: further automation of the manufacturing process and increased sales volume as the number of personal computers goes up. "Price is eroding fast," states Kapoor. Dataquest predicts that daisy-wheel printers in the 20-30 characters per second (cps) range, now averaging at \$1000, will be priced under \$500 in 1988. In the same five-year period, the average price of dot-matrix printers in the 120-250 cps range will fall from \$1000 to \$400.

Even if prices were to remain the same, performance per dollar will go up. According to Hoper, "Functionality will be important," and "more features [will be] added"—color, higher resolution, higher speed. Busby points out that some of the increased performance won't raise prices because it results from engineering and doesn't increase manufacturing costs appreciably.

### Matrix Evolution

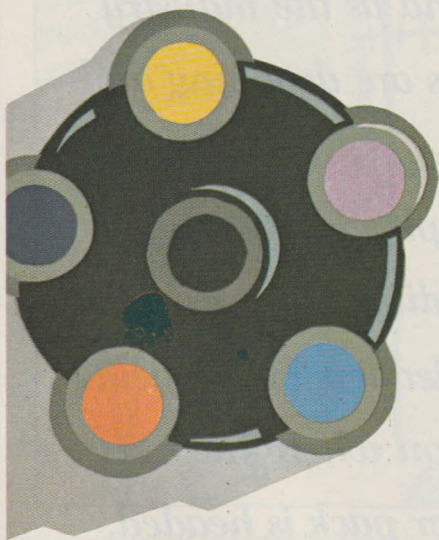
Many engineering improvements involve print quality. A new dot-matrix printer category, near letter quality, combines multiple passes with smaller, more numerous pins in the dot-matrix print head to create darker, more defined characters. Print speed is compromised as a result.

The 24-pin heads used in many near letter-quality printers were developed in Japan to print the pictographic Kanji characters. Other manufacturers use 18 pins in two staggered columns of nine to approach letter quality. Datasouth's Busby feels "very strongly about an 18-wire head being the optimum population of wires" for use with the less demanding western alphabets. According to Busby, the 24-wire head with its smaller diameter wires must fire at a higher frequency to get as much ink on the paper in a given time period. It's also more costly and more likely to penetrate the fabric of the ribbon, causing snagging.

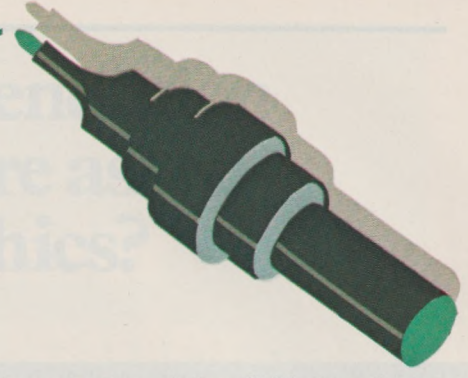
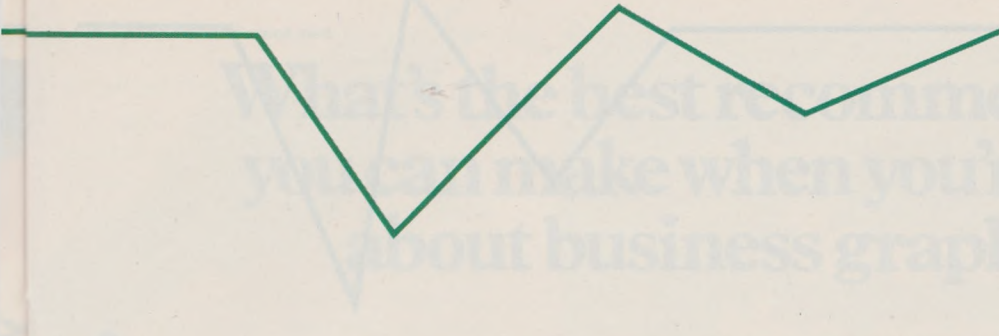
In spite of improvements like these, almost everyone agrees that impact dot-matrix printers will never reach daisy-wheel print quality. According to Theo Loevenich, general manager of Phillips Peripherals Inc., the limiting factor is the thinness of the print head needles. They cannot be made small enough to form fine details in a character.

### Close Enough?

Near may be near enough. Future Computing's Hoper feels that as print quality becomes better and better, people will also lower their standards. Loevenich agrees—"A year ago people were measuring the per-







formance of a letter-quality printer or other printer by the single character. First thing, people would take out their magnifying glasses. Today, the impression that the page makes is more important."

Even if you still use a magnifying glass, several compensating features make these printers attractive. (See the DS-220 review, this issue.) In addition to a letter mode (the nearer letter quality, the slower), there are usually two faster modes: a memo mode suitable for in-house communications and a high-speed draft mode to whip off test copies, printouts and program listings. If you have multiple needs and can afford only one printer, this almost best-of-both-worlds solution may be optimal. Not only can dot-matrix printers produce readable correspondence, they can also print graphics and change fonts easily.

#### Daisy's Demise?

As other technologies' print quality approaches letter quality or better and graphics ability becomes more important, the survival of daisy wheels becomes a question. "HP stopped investing in character printers about five or six years ago because of the need for graphics, for character fonts and character set flexibility," says Chuck Ulfers, marketing manager for printer products at Hewlett-Packard.

Loevenich points to today's business software as creating pressure for printers that do graphics. Says Loevenich, "The daisy-wheel market really isn't a growing market anymore. It still will grow—let's be optimistic—15 percent maybe, which is still a significant number considering the installed base, but considering the

speed at which the market's growing, it's a fairly small number."

Dataquest's Kapoor sees "some kind of growth" for "all types of printers. I think people finally have a choice. If prices are reasonable, they can go and buy what they want—different printers for different purposes."

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**"A year ago people were measuring the performance of a letter-quality printer or other printer with a magnifying glass. Today, the impression that the page makes is more important."**

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More expensive daisy wheels seem the most likely to suffer, especially with some of the new entrants like the cheaper, laser page printers. "High-end daisy wheels will feel significant pressure from [lasers]," Hoper says. Future ink jet printers with near typographic quality could also be competitive in this area. It should be remembered, however, that non-impact printers cannot process multiple-copy forms.

Low-end, slower daisy-wheel printers appear to be safely thriving and multiplying. According to Hoper, the

inexpensive daisy field is where "most of the action is happening." Only daisy wheels can do letter quality at less than \$500.

Chuck Ulfers agrees that the "daisy wheel will still be the leading technology in the ultra-low-cost printer area," although he feels that HP's ink jet printers are also getting into that market.

#### Noise Pollution

Noise is a problem with impact printers. You wouldn't want to sit next to one while conversing on the phone. Both types, dot matrix and daisy wheel, are becoming quieter, however. Phillips Peripherals Inc. has just introduced the GP300LC dot-matrix printer. At \$3200, it's expensive, but it produces "letter quality" at 120 cps quietly (under 51 db), compared to more than 55 db for most dot-matrix printers and even more for today's daisy wheels.

Ricoh's new line of 25, 40 and 50 cps daisy wheels are quieter still at under 50 db. According to Edward Regazzi, vice president of the New Jersey firm's printer division, Ricoh will sell this line directly, a change from its usual OEM channels.

The newer printer technologies are nonimpact and inherently quiet—ink jet, thermal transfer and the different types of page printers. Because of their relative silence and promising print quality, they're taking an important place in the printer market.

#### Heat Wave

One quiet technology, already established in Japan, is arriving stateside in force. "You name a Japanese company, and they've got thermal transfer printers going. Everybody will have



them. Everybody." So says Roy Irvine, a product line manager for printers at Tandy Corp. in Fort Worth, TX. Okidata, for instance, announced an inexpensive, 60 cps, color thermal transfer printer at June's Consumer Electronics Show in Chicago.

Industry people agree on the good features of thermal transfer and on some of its weak points. Arnie Peters, product manager for printer products at Sharp Electronics Corp. in New Jersey, enumerates quietness, print quality "awfully close" to daisy wheel and good graphics resolution as desirable traits. Thermal dots are smaller than those produced by dot-matrix impact printers; print speeds are similar to a daisy wheel's at less cost. A disadvantage is that thermal ribbons, especially multicolored ones, are expensive. A \$7 color ribbon is good for 16 pages; that's 44 cents per page.

Hoper also likes thermal printers' light weight. He points out that low cost, portability and high-resolution color graphics make thermal transfer printers a good match for home computers. Ribbon costs, Hoper agrees, are significant, but "as [the market] matures, [prices] will come down."

When it comes to the smooth-surfaced paper required for high print resolution, opinions vary. Apple Computer claims its Scribe thermal

transfer printer uses regular paper. Sharp's Peters says, "It's plain paper; however, the surface has to be smooth."

The people at Tandy are more cruel. Van Chandler, Fort Worth's director of merchandising for business products, calls the paper "funny, slick."

And Roy Irvine credits thermal transfer with high resolution, but "on regular paper, you get a lot of voids...it looks terrible."

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**Rather than employing the usual piezoelectric exciters, ThinkJet uses resistors that thermally excite the ink. Says HP's Tom Braun, "We do think we're on the right track."**

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#### **HP's High Profile**

In the newer technologies, Hewlett-Packard maintains a high profile with its high-powered, hot peripherals. The ThinkJet printer is ahead of the pack in innovations. Burt Desmond, marketing manager for the Vancouver ThinkJet division, comments that "the most unique technological contribution is that we have this low-cost disposable print head...

[with] no need for any plumbing system. [We] battle the problem of the corrosiveness of the ink by designing the print head...so it lasts a short time."

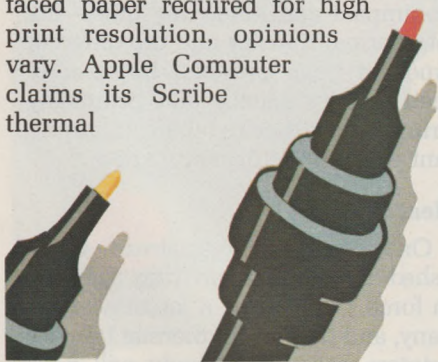
Rather than employing the usual piezoelectric exciters, which essentially squeeze ink onto the paper, ThinkJet uses resistors that thermally excite the ink (the resultant expansion causing it to jet out). Tom Braun of the ThinkJet research and development team, explains that "the expense per nozzle is cheaper than for piezoelectric; the mass production capability is much superior." Also, according to Desmond, the print head "can be pulsed at a very high frequency." As a result, the bold mode puts extra ink on the paper without slowing print speed. The 100 percent duty cycle makes 150 cps more productive than it sounds.

Even HP's competitors speak well of ThinkJet. Datasouth's Busby thinks that "price/performance-wise, it's an extremely good bargain now. What I'd find exciting if I were at HP is that it's just the tip of the iceberg. They can go color, they can increase the number of orifices and control their size, and it's extremely high frequency [up to 2500 Hz]."

Braun, more modest, would only allude to higher speed and greater resolution for the future. "We do think we're on the right track."

For the ink jet industry in general, Desmond sees "significantly improved print quality, approaching typographic," and color.

Roy Irvine of Tandy believes that high resolution is not far away and can be "brought down to 200-300 dots per inch (dpi), all you need, in a very cost-effective way."





# What's the best recommendation you can make when you're asked about business graphics?

## The New Business Professional Plotter from Hewlett-Packard—The 6-Pen HP 7475A

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## Another choice: HP's low-cost, high performance Personal Computer Plotter

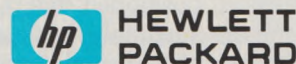
For the "business on a budget," you may also want a look at our 2-pen Personal Computer Plotter, the HP 7470A. Its low-cost (only \$1095) is as remarkable as the quality of its plots. With many of the same features as the new HP 7475A, the HP 7470A plots on media up to 8½ x 11." It stores and caps two-pens, and you can easily change the pens for multi-color plotting.

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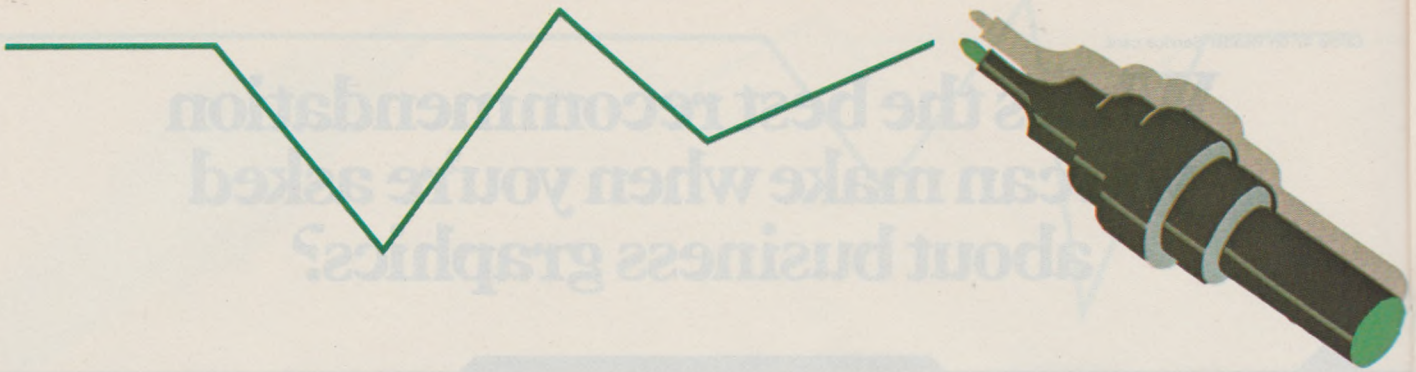
Phone Number ( ) \_\_\_\_\_

My computer is \_\_\_\_\_

Send to: Hewlett-Packard, 16399 W. Bernardo Drive,  
San Diego, CA 92127  
Attn: Marketing Communications

11304 M19





Several printer industry people warn that ink jet reliability hasn't yet been demonstrated. The main bugaboo is clogging. There is also the present requirement for short fiber paper to prevent ink spread. According to Desmond, HP is taking a two-pronged approach; increasing the number of suppliers (thus availability) and "working as we can with the ink technology to make the paper requirements indifferent to the users."

#### **Pages per Minute**

Another HP star, the LaserJet page printer (see p. 74 for our review), has broken the price barrier for laser printers. Using the Canon copier-based laser engine, it quietly prints eight pages per minute with up to 300 dpi resolution in several cartridge-based fonts. Its 3000-page per month duty cycle limits its use, however, to well-heeled PC users and word processing stations for large computer systems or shared networks.

HP thinks 3000 pages per month is enough. The single user "typically prints about 500 pages a month," according to Chuck Ulfers. Hewlett-Packard positioned the LaserJet to compare favorably against a daisy-wheel printer of similar price. Future Computing's John Hoper agrees that 3000 is enough. "It's not going to be the big workhorse but will be fine in many applications."

It may be that the LaserJet, perhaps destined for overuse, will serve as an inexpensive introduction to laser printers. If a company finds its LaserJet can't do the job, HP has higher-priced models with higher capacities.

Laser is not the only type of page printer. In the long range, it may not be the best technology. "Laser is

more complex than some of the other technologies that are being explored," says Chuck Ulfers.

One possibility is the monoline CRT system used in Phillips Peripherals' higher-priced, heavier-duty Elpho 20 page printer. Tandy's Van Chandler indicated that "there are some better [page printers than the LaserJet]. We're taking a look at them—hopefully at a better price."

Another possibility was just introduced at the end of July. The Ferix Corp. Model 800 magnetic page printer uses an array of 120 thin-film magnetic heads to put an image on a mag-

---

**Is the graphics trend justifiable? The plotter people think so. According to HP's Mick O'Roarke, "Plotters make the analyst a better communicator."**

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netic sensitive drum. Like the LaserJet, it uses a monocomponent toner. It produces ten pages per minute (14 in duplication mode) with 240 dpi resolution.

Timothy Fondiller, director of product management for the Fremont, CA, firm, says the printer is intended to sell for under \$5000, has a duty cycle near 10,000 pages per month, a large number of cartridge-based fonts and paper handling capabilities superior to the LaserJet. The printer drum holds the magnetic print image for thousands of copies, acting essential-

ly as a storage buffer for the printer.

#### **Graphics Driven**

The eventual success of plotters like the superfast HP-7550 (see p. 60 for a review) will be brought about by a new generation of graphics-oriented business software. Right now, plotters are undergoing "very high growth," according to Mick O'Roarke, product manager for the HP-7550, due to the "growth of graphics. It brings [plotters] more into the mainstream, spurred on by the software people."

Is the graphics trend justifiable? The plotter people think so. "I don't believe it's an artificial need," O'Roarke says. He argues that people who use programs like VisiCalc and Lotus 1-2-3, analysts and middle managers playing "what if" games, are responsible for the growth of Apple and IBM. O'Roarke argues further that "a natural outgrowth of this is graphics to communicate your findings. Plotters with their presentation-quality graphics provide a clearer direction or greater emphasis to your point. [Plotters] make the analyst a better communicator. That's really the way we see the market."

According to O'Roarke, "there are some really good graphics packages out there now—Picture Perfect, Graphwriter, Chart-Master, pfs:Graph, just to name a few. SuperCalc [is] an integrated package with good graphics."

Except for the last, these are dedicated graphics programs rather than whiz-bang integrated packages. Tandy's Irvine comments, "I don't think the software is there yet, where you can just press a button. You still have to stop what you're doing, get out the graphics package and do the graph."



## Personal Plotters?

A new development in the plotter market may be the "personal plotter." There are companies coming out with plotters priced at under \$500. Comrex International just bundled its Comscriber I with the KeyChart graphics package for \$495 (see p. 52). Sharp has come out with a similar product for \$400. It too comes with KeyChart and does transparencies. The Sharp Plotter sets a record among low-end plotters with a low .2 mm step size.

You'll be seeing more low-end plotters bundled with graphics software. According to Kevin O'Leary, president of Softkey Software Products, developers of the KeyChart graphics package, "Plotter manufacturers and vendors have realized now that they must take a system to market. A plotter by itself has no power." One of the outcomes of such marriages may be a proliferation of plotters, or as O'Leary put it, "a plotter on every desk."

## Vendor Problems

Will color thermal transfer and ink jet printers cause problems for plotter vendors? According to O'Roarke, four things must happen first: the printers must develop higher resolution; software must be converted from the vector graphics used by plotters to raster graphics (and the accompanying mass storage problem must be solved, especially with higher resolution); ribbons will have to be developed to do transparencies (good ones need a different dye concentration than paper does); and the color selection will have to be improved. These printers use cyan, magenta and yellow. According to O'Roarke, people "wouldn't like any of these colors by themselves, and together they're even worse."

Concluded O'Roarke, "Plotters are going to be around." It appears that all of these products are going to be around for a while. Whatever refinements and added features they develop, let's hope the prices keep dropping. ■

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# LaserJet





If you think laser printers are only for high-volume data processing departments with five-figure printer budgets, think again. Hewlett-Packard's recently introduced \$3495 LaserJet printer brings laser speed and quality into the price range of anyone who's considering a heavy-duty daisy-wheel printer.

LaserJet's claimed specifications are impressive: eight pages per minute print speed, 300 dots per inch resolution, plug-in font cartridges, 55 decibel noise rating. It does, however, have some limitations, and there are drawbacks to its copier-like paper-feed mechanism.

#### Under the Hood

The LaserJet is built around Canon's LBP-CX laser copier engine. Introduced at 1983's Comdex/Fall show, the laser engine can take most of the credit for making LaserJet so affordable.

The most significant LaserJet component is its disposable, \$99 drum and toner cartridge. The drum is the part of a copier that receives the image-forming toner and transfers it to the paper. It's also the bane of almost any copier owner's existence because of its need for frequent preventative maintenance (which, somehow, never seems to prevent anything except the service company's bankruptcy).

LaserJet's disposable drum is coated with a plastic laminate instead of the more common selenium. (Selenium-coated drums must be either resurfaced or replaced when worn out.) The cartridge contains enough toner to last the life of the drum (roughly 3000 pages). Since toner and drum are packaged together, when you re-

place the toner, you're also replacing the drum and, therefore, performing virtually all the maintenance the machine ever needs.

#### How It Works

LaserJet attaches to your computer's serial port and receives text at speeds up to 9600 bits per second (bps). Once in the machine's 50KB buffer, text is processed by the printer's character generator ROM. The ROM contains character dot patterns for 182 characters—the regular ASCII character set,

(horizontal) orientation. Most optional font cartridges contain three or four different typefaces. The cartridge provided to *Microcomputing* contained ten-pitch Courier italic and bold, as well as a 16.66-pitch typeface called Line Printer Light that's landscape-oriented and ideal for megacolumn spreadsheets. HP says more fonts are on the way, including proportionally spaced typefaces.

#### It's Done with Mirrors

From the character generator, the dot patterns are converted into electric pulses, which modulate the semiconductor infrared laser beam. The beam is then reflected off of a six-sided mirror that rotates at 5600 revolutions per minute. From there, it goes through a series of lenses and onto the surface of the drum, thus drawing the image from top to bottom, one line at a time (see Fig. 1).

The laser optics illustrate an interesting example of cost-cutting engineering that doesn't compromise quality. When an image is drawn, every line must hit the drum surface completely horizontally. Most laser printers achieve the needed accuracy through precision optics and meticulous manufacturing processes.

Meticulous precision doesn't come cheap, however, and one of Canon's chief requirements was that the laser engine be able to use mass-produced parts. It solved the problem by adding a compensator lens that compensates for any scanning deviations. The compensator lens let Canon use a mass-produced, metal rotating mirror instead of one made of expensive optical glass.

**The most significant LaserJet component is its disposable, \$99 drum and toner cartridge. The drum is usually the bane of any copier owner's existence.**

plus various foreign language characters.

The Canon engine is designed to simply reproduce raster video images. It's the HP-added interfacing and character-generating circuitry that turns it into a printer. The printer has two fonts built in: ten-pitch Courier in portrait (vertical) and landscape



# LaserJet

## Setup

Setting up the LaserJet is harder than using it. First, you (and probably someone else) lift the 71-pound unit out of its box. Then you open the unit and remove several packing spacers. Next, you unpack the toner/drum cartridge, rock it back and forth a few times to distribute the toner, break off a little sealing tab and slide it into place. Finally, you insert a special cleaning pad in the machine and snap the paper trays into place.

Once the unit's put together, you have to find a home for it. The printer isn't especially huge or noisy, but it has one fault that may keep you from setting it up on your desk: it stinks. After the machine's been printing for a few minutes, the stench of fried toner becomes more than noticeable; it's annoying. HP is aware of the odor problem; the manual tells you to use the printer in a well-ventilated room.

The LaserJet's paper tray works just like a copier's. You place up to 100 sheets of copier bond in the tray and push the paper until two little corner retaining clips grasp it. You then slide the tray into the front of the printer.

To put your computer and the printer on speaking terms, you'll probably have to reconfigure the computer's serial port. With the IBM PC, the procedure involves setting up a batch file that uses the MS DOS Mode program to configure the RS-232C port to a 9600 bit rate, eight-bit word length, one stop bit and no parity. Then you redirect the line printer device to the serial port (Mode LPT1:=COM1).

## Using LaserJet

For most purposes, LaserJet is as easy to use as a copier. Its LED status

display uses cryptic two-character messages to convey error and status information. When the display reads 11, for example, the printer's out of paper. There's a small legend next to the display that provides the meanings to the four most common printer conditions (waiting, self test, paper out and paper jam); if anything else comes up, you have to refer to the manual.

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**The LaserJet has a big flaw—it stinks. After the machine's been printing awhile, the stench of fried toner is more than noticeable.**

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You use the five membrane-type function keys on the printer's front panel to put the printer on- and off-line, to reset it and clear its buffer, to invoke a form feed and to switch into manual paper feed mode. The on-line, form feed and manual feed switches have indicator lights.

The way the form feed indicator light is used is a little confusing. The indicator goes on when there's text in the printer's buffer and flashes when the printer is actually performing a form feed. The confusion arises if you're printing a document that's less

than a page long. Since the printer formats and prints an entire page at once, less-than-one-page documents that don't end with a form feed code are simply stored in its buffer. To actually print them, you have to take the printer off-line, press the form feed key, then place the printer back on-line.

There are occasions when the LaserJet's unique printing method causes headaches. One is when you want to print a simple envelope. The printer always formats a page as if it were printing a full-sized page, so you first have to set your left margin to one and your right margin to 95. Next, begin your return address at line 25, column 12. The addressee's address begins at line 36, column 60. Then, since you can only feed paper into the machine one way, you have to send the printer an escape sequence that switches it into landscape printing mode, rotating the characters 90 degrees counterclockwise. (Remember to set it back when you're done.) The phrase "more trouble that it's worth" comes to mind.

The escape sequences themselves can cause headaches, too. HP's printer language resembles no one else's, so existing software generally can't take advantage of some of the machine's features, unless you're willing to embed four- and five-character escape sequences in your text. HP includes a package of data sheets that tell you how to reinstall most popular packages to better exploit the printer.

## Performance and Appearance

I tested the printer's speed by setting up a 22000-character test file that comprised 55 80-character lines. LaserJet printed it in one minute, 24 seconds. That's roughly 265 characters



per second. The printer churned out four such pages per minute—half of HP's claimed specs, but impressive anyway.

Under close scrutiny, the LaserJet printed page looks like a photocopy of a typewritten or daisy-wheel printed page. The letters appear fully formed, crisp and dark. But they still look photocopied, which illustrates the unavoidable drawback of printers based on copier technology: even the originals are copies.

#### Who's It For?

Where speed, silence, print quality and the ability to print graphics are important considerations, LaserJet shines. With a claimed duty rating of 3000 pages per month, the printer can churn out about 130 pages a day.

**Type of printer:** Nonimpact laser.

**Interface:** RS-232C serial.

**Buffer size:** 50KB.

**Resolution:** 300 dots per inch maximum, software selectable.

**Claimed speed:** Eight pages per minute.

**Observed speed:** Four pages per minute; 265 characters per second.

**Dimensions:** 18.5W x 16.2D x 11H inches.

**Power Consumption:** 850 watts.

**Accessories:** Font cartridges, \$225; Replacement toner/drum cartridges, \$99.

**Manufacturer:** Hewlett-Packard Co.

1820 Embarcadero Road

Palo Alto, CA 94303

These factors make it best suited for use in local area networks, or for the small- to medium-sized office.

The machine isn't perfect, though. Its copier-like feed mechanism rules out fanfold forms of any kind, and you can forget about multipart carbon forms, too. For those jobs, the daisy wheel still reigns. Second, the printer's nonstandard escape sequences can make accessing its special features difficult. Finally, the odor given off by the thing can be downright offensive.

What's more significant about LaserJet is its price. Hewlett-Packard may not be able to take credit for building the world's greatest printer, but it deserves credit for taking a lead in making sophisticated technology more affordable. ■

#### Optical System

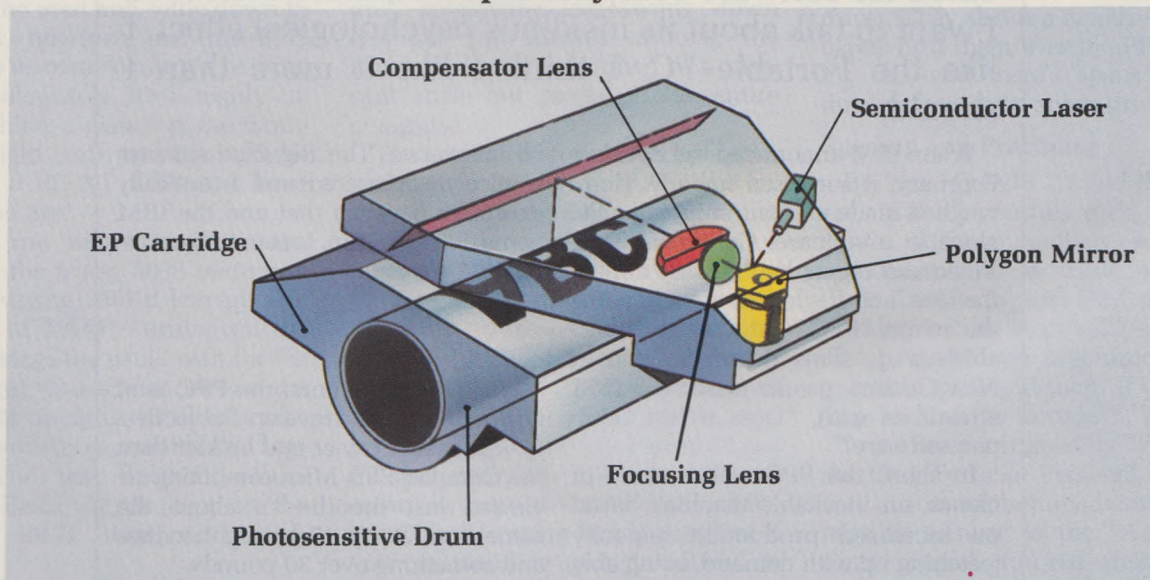


Fig. 1. Optical system for the LaserJet printer.



# The Clone Of Clones?



By Eric Grevstad  
Senior Writer

**T**his could be a one-sentence review; I could say IBM's Portable PC weighs and costs a ton and has a noisy keyboard but works like a charm and is a cinch for software compatibility. But, more than that, I want to talk about its insidious psychological effect. I like the Portable PC. I think I like it more than I should.

When IBM announced the PPC last February, it surprised nobody. Compaq had made millions shipping a PC clone in a suitcase; Columbia, Tele-Video and others had already copied the idea, and Eagle was already using the name "PPC." At the transportable's trade show debut, Softcon in New Orleans, people teased the IBM attendants with, "Does it run Compaq software?"

In short, the PPC was a clone of clones, an inevitable machine based on increased production capacity (catching up with demand, being able to turn attention from PC and XT sales) rather than new technology. However, IBM has never needed to

be innovative. The Big Blue suitcase is nicely engineered and beautifully executed; between that and the IBM name, it'll sell a ton. I seem to keep using that phrase.

## Heavy Traffic

Like its competitors, the PPC is at best a short-haul traveler. Subjectively, it seemed heavier and bulkier than the Compaq Plus Microcomputing reviewed last month—it's about the same size, 20 by 17 by eight inches and something over 30 pounds.

The heavier feeling may be due to my preference in carrying handles. The spring-loaded sliding latches that



attach the PPC's keyboard to the system unit are the best transportable arrangement I've seen, but its handle is a long narrow bar compared to the Compaq's comfortably centered and padded affair.

Actually, you're not supposed to carry the PPC by its handle; the computer comes with a natty blue denim travel bag with a side pocket for the power cord (there's no provision for stowing the cord in the PPC, so it's easy to forget).

Unzipping the bag, laying it flat, putting the PPC in its center and zipping it back up is a tedious process, but the bag has both a regular handle and a shoulder strap. Slinging the PPC over my shoulder, its weight pulled me around in a pratfall; trying the strap diagonally over my opposite shoulder, I gained new respect for my mailman. The IBM's not much worse than other transportables, but it's a bear.

### On the Desk

Pull off the road and settle down to desk work, however, and the PPC comes into its own. While it's nothing new technologically, it's a highly capable machine: a glance at the motherboard might make you think you're looking at a PC XT without a hard disk. So you are.

In fact, the motherboard is the XT's, with the trusty 8088 microprocessor surveying 256KB (expandable to 512KB) of RAM. Turning on the machine brings the usual wait for the memory test (the screen shows the RAM count rising in 16KB intervals, so at least you know something's happening). The test finished, you're either in Basic C1.10 (kept in the machine's 40KB ROM) or booting drive A.

Such techie details won't bother the PPC's mobile executive buyers; as far as they're concerned, the machine



simply looks good on a desk. With its lower latches attached to the system unit, supporting feet swung down and the top latches undone, the keyboard is not only tilted at a pleasant angle but props up the entire computer.

The keyboard, connected by a telephone-style 30-inch cord, can be removed and held in your lap, but that may leave the screen too low for your taste; the front panel's overhanging top edge blocks the view from certain angles. I left the board attached and the cord in its handy recessed slot.

Aside from its nice cord, latches and a beige (instead of white) faceplate, the keyboard is the usual 83-key PC unit, complete with tiny shift and return keys in awkward places. Like the PC's, its typing feel is excellent if you can stand its springy metallic or telegraph noise; I'd rather type on the IBM, but I'd rather have a conversation near the Compaq.

### Forever Amber

The PPC's nine-inch monitor follows today's fashion trend from Europe, using amber instead of green phosphors. It's a good trend; the amber screen looks odd at first glance but is clear and easy to read over long periods of time. With the PPC's brightness and contrast controls, you can produce text sharp enough to please anybody.

You'll be less pleased with the transportable's graphics. The PPC will boot and run programs that require a graphics board on the PC, but its resolution's poor and its shades of amber don't imitate colors well. Simple pie or bar charts will be no problem, but games, for instance, look much better on the monochrome Compaq.

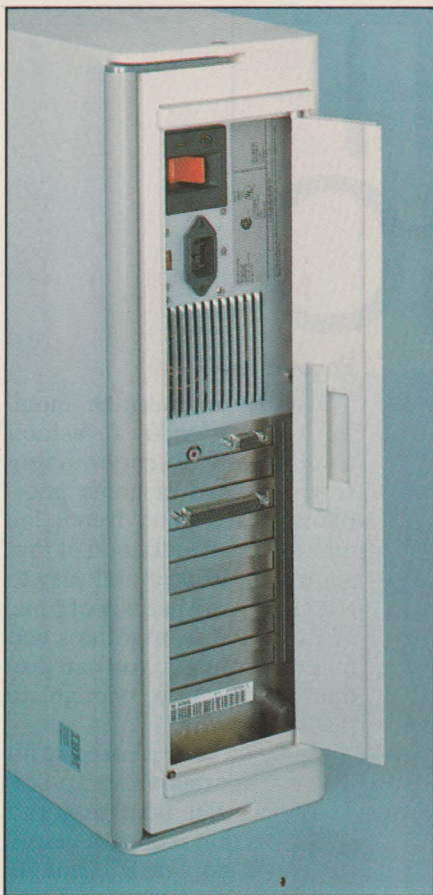
If the screen's good, the half-height 360KB disk drives are great. Besides looking sharp, the double-sided, double-density units have ingenious latches that only close when there are disks in the drives. They also run quietly—you can barely hear them over the PPC's cooling fan—and there's space to store three or four disks above drive A:

### Reading and Practicing

Besides PC DOS 2.1 and the extensive IBM diagnostics disk, the PPC comes with two manuals—a guide to operations and a Basic reference book. They're typical IBM products, blandly written, thoroughly complete and painstakingly organized ("Have you done such-and-such? If yes, go to page X. If no, go to page Y:").

I was more intrigued by "Exploring the IBM Portable Personal Computer," a sort of buttoned-down, businesslike answer to the "Apple Presents Apple" tutorial disks. After some opening Mozart, the IBM disk takes beginners through numbingly dull exercises for those who've never





seen a keyboard ("Press the letter 'a.' Now hold down the shift key and press it again.").

These are followed, however, by FunWriter, an almost serviceable program in its own right, which introduces the concepts of word processing via an odd mixture of practicality (cut and paste commands) and function keys to turn on and off things like music and an animated border of blinking hearts.

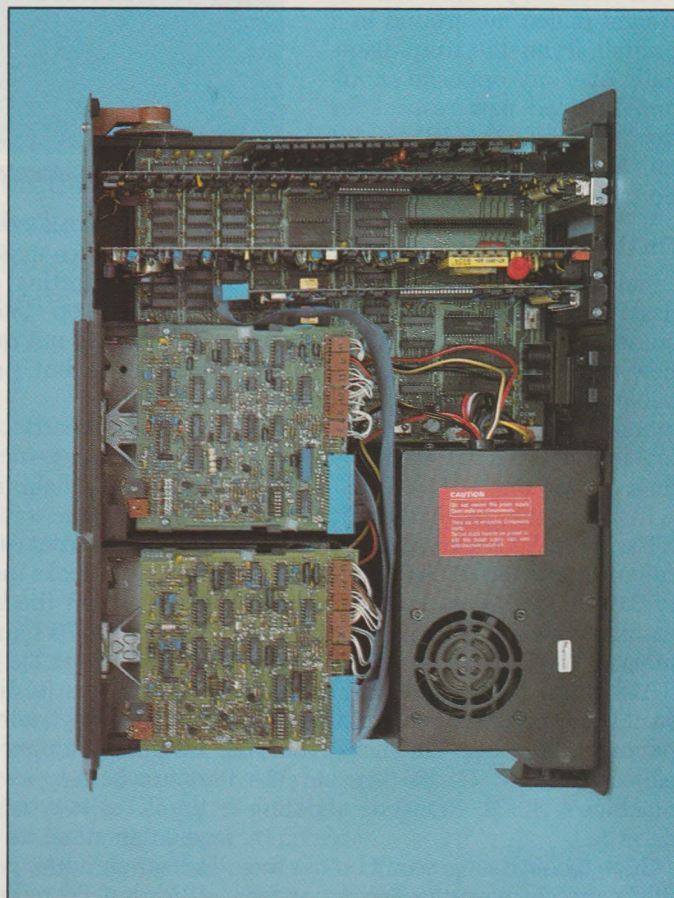
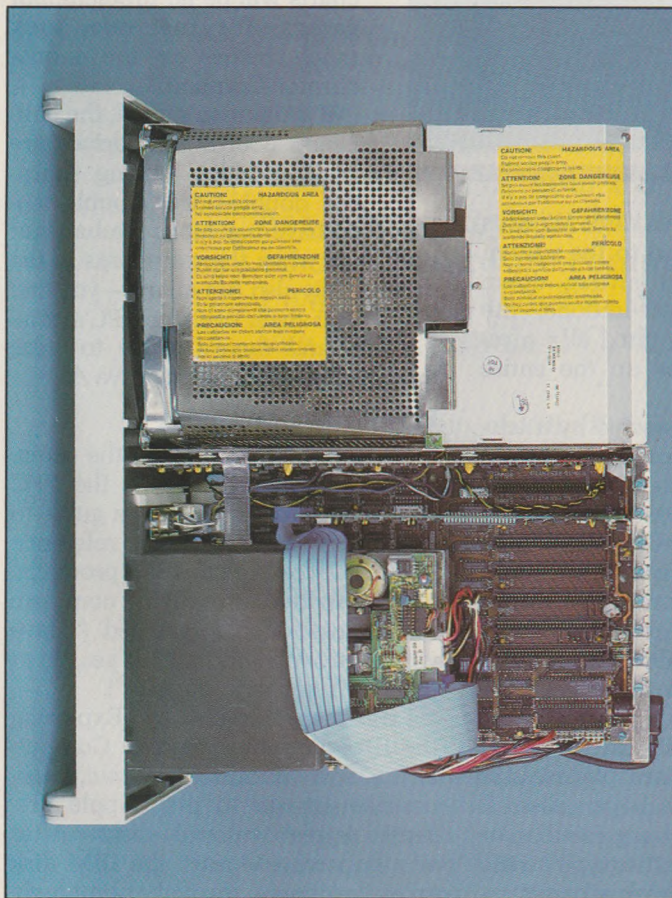
Next, more impressively, comes Practice DOS, a program that lets novices master syntax for such commands as Format and Diskcopy without disk access—imaginary files bounce back and forth between pretend disks, with on-screen graphics showing transfers and copies. Fol-

lowed by a subset called Practice Basic, it's a terrific, if limited, learning tool.

### Short Slots

Speaking of limited, would you believe you can buy a computer for more than \$3000 that has neither a parallel printer interface nor an RS-232C serial port? The PPC has a color/graphics monitor adapter for connection to a bigger screen and a disk drive adapter that connects to IBM's bulky expansion unit (a 10MB hard disk in an XT system unit case). But if you want to hook up to anything else—say, to print something—you're talking options.

Left: After being propped on its side, the PPC opens its door, showing the external hard disk and monitor interfaces and a row of empty expansion slots. Note the 120/130 volt power switch adjacent to the ac cord socket—a nice feature for European travelers. Below: The PPC motherboard (left) has only one full-length and four short expansion slots compared to the more accommodating desktop PC (right).





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EXP 550 Par.	529
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Advertised prices reflect a cash discount on prepaid orders only. Most items are in stock for immediate delivery in factory sealed cartons with full factory warranties.

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### AMDEK

Color I	\$275
Color I +	319
Color II (RGB)	399
Color III (RGB)	349
300 G (12" green)	135
300 A (12" amber)	145
310 A (IBM PC)	169

### BMC

12 AU (12" green)	\$79
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### NEC

JB-1201 (12" green)	\$155
JB-1205 (12" amber)	155
JC-1212 (12" color)	339
JC-1216 (12" RGB)	439

### PANASONIC

12" Green Monochrome	\$169
12" Amber Monochrome	179
13" RGB	389

### SAKATA

SG-1000 12" Green	\$99
SC-100 13" Color	269
SC-200 13" RGB	499
SC-300 13" RGB	659

### TAXAN

KG 12N (12" green)	\$129
210 (13" color)	299
400 (13" RGB color)	299
410 (13" RGB color)	379

### ZENITH

Z-122 (12" amber)	\$139
Z-123 (12" green)	109

## —HARD DISKS—

### CORVUS

Omninet 6	\$1695
Mirror Back-up	670
Print Server	839

### TALLGRASS TECHNOLOGIES

20MB Hardfile Disk for IBM-PC	2695
70MB Hardfile Disk for IBM-PC	Call

## —DISKETTES—

### Maxell

5 1/4" MD1	\$22.95
5 1/4" MD2	32.95

### 3M/Scotch

5 1/4" SSDD	\$21.95
5 1/4" DSDD	30.95

### Educator

Lifetime Warranty	
5 1/4" SSDD	\$16.95
5 1/4" DSDD	21.95
Flip 'n' File/holds 50 Disks	17.95

## —BOARDS—

### IBM PC BOARDS

Amdek MAI Graphics Board	\$479
AST Sixpak plus 64k	299
AST Megapack 256k	569
CCS 132 Column Board	589
Microsoft 256k RAM Board	299
Plantronics Color + Board	399
Quadram New Quadboard	Call
Quadram Quadlink Board	Call
Tecmar 1st MATE Board	229
Tecmar Graphics Master Board	569
PC Peacock Graphics Board	299
64k Chip Kit (9 Chips)	Call

## —SYSTEMS—

### COLUMBIA

VP Portable	Call
MPC 1600-1	Call
MPC 1600-4	Call

### CROMEMCO

CS-1	3195
CS-2	3755
CS-3	5595
64 FDC	475
TUART	255

### EAGLE

II E Series		PC Series	
II E-1	II E-2	PC-2	PC-1 +
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1600 Series		SPIRIT	
1620	1630	Portable	

—Call us today for the best prices—

### BMC IF800 COMPLETE BUSINESS SYSTEM!

### MORROW

New Portable w/2 Drives & Software	Call
MD11 w/H Disc & Software	Call

### NEC

PC-8201 Portable	Call
PC-8800 Small Business System	1669
PC-8800 16-Bit System	1999
PC-8800 System w/8-in. Drives	2299

### NORTHSTAR

Advantage	Call
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### SANYO

MBC 1200	1299
MBC 550	Call
MBC 555	Call
CRT-36	159

### TELEVIDEO

TS-803	\$1989
Portable	Call

### ZENITH

151-22 w/2 Drives	\$2495
151-22 w/Hard Disk	3995
161-22 Portable	Call

## —TERMINALS—

### ESPRIT SYSTEMS

Esprit	\$489
Esprit II	499
Esprit III	649
Exec. 10/102	799
Exec. 10/102G	1249

### New!

### Televideo Personal Terminal

Personal Terminal	\$399
Personal Terminal w/300 baud modem	529
Personal Terminal w/1200 baud modem	849

### TELEVIDEO

910	\$439
914	579
924	695
925	699
950	865
970/50	949

### QUME

102	\$569
108	715

### WYSE

50	Call
75 color	Call

### ZENITH

Z-29	\$659
ZTX-10	319
ZTX-11	389

## —MODEMS—

### HAYES

Smartmodem 300	199
Smartmodem 1200	498
Smartmodem 1200B	Call

### NOVATION

D-Cat	\$149
J-Cat	99
Apple Cat II	269
103 Smart Cat	179
103/212 Smart Cat	399
212 Auto Cat	549
Access 1-2-3	449

### SIGNALMAN

Mk II	\$75
Mk XII	279
Mk VII	\$95
Volks-modem	59

### U.S. ROBOTICS

300 Baud Password	\$149
1200 Baud Password	339
PC 1200 Baud Modem	329
S 100 1200 Baud Modem	329

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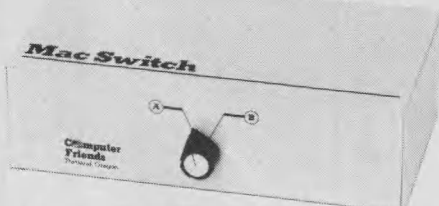
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**Mac Switch lets you share your computer with any two peripherals (serial or parallel).** Ideal for word processors—never type an address twice. Ask us for brochure with tips on how to share two peripherals (or two computers) with **MAC SWITCH**. Total satisfaction or full refund.

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## Computer Friends

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(503) 297-2321

From the outside, the interface slots are revealed by lowering the closet-style folding door that covers the PPC's power switch, ac cord outlet and fan. (It's a handsome arrangement but a flimsy one; one of the door's plastic pegs broke on the PPC's first day in our office.)

Installing, as opposed to using, options is more complicated; you must remove six screws (three unattainably recessed), lift off the system unit's cover, undo three more screws and take the metal shield from the expansion area.

Once you've done that, though, there's ample room for improvement: the video and disk controllers fill slots 1 and 3 and slot 8 is mysteriously unsupported, but the remaining five expansion slots are vacant, waiting for memory upgrades or communications or joystick adapters.

As long as your memory or joystick upgrades are on short boards, that is. Only slot 2 has a full-length space, and that's cluttered with cables from the brightness and contrast controls; slots 4 through 7, tucked behind the drives, are too stubby to hold many of today's popular add-on cards.

Finally, owners of single-drive PPCs can move up to two disk drives, though the operations manual's no-novices warning and formidable instructions belie the IBM press release description of the second drive as "customer installable."

### Joining the Establishment

But many PPC buyers aren't going to care about things like expansion slots. They'll want an utterly compatible machine, something guaranteed to run every piece of IBM software in the world, that's also nominally transportable for occasional moves between home and office. The PPC delivers that and also delivers something else—the insidious psychological effect I mentioned.

Seen objectively, this machine is no bargain: it works well and has nice touches like the amber screen and prop-up keyboard, but there's a lot it doesn't have. Unlike its competitors, IBM doesn't offer a PPC with a hard disk, probably for the same reason Tandy stuck with floppies for its much lighter and more portable TRS-80 Model 4P—figuring that you're more concerned with mobility and can hook up to a Winchester in the office for mass filing. But does IBM think you'll hook up to an expansion unit for parallel printing or RS-232C

interfacing? As it comes out of the box, the PPC at \$3020—and that's after IBM's June price cuts—is still too expensive.

However, this is a case where "You get what you pay for" doesn't refer to equipment. It refers to the IBM name, and I find—shortcomings, deafening keyboard and all—that it feels good to have an IBM on my desk. It's inexplicable; I usually fight with the tech editors for a chance to play with the latest innovation, but now I find myself sitting smugly in front of a basically dull machine.

There's something stable and secure—something comfortably Republican—about the PPC. If I had it much longer, I'd probably start wearing a tie to work.

Mercedes-Benz makes fine cars, though they cost more than the three-pointed star's worth; IBM makes fine computers, though they cost more than the three-letter name's worth. I can't really recommend the PPC, but I must say it's very attractive.

As long as you don't try to move it, that is. Even urbane Republicans don't look good staggering. ■

### A Capsule Look at IBM's Portable PC

#### Manufacturer

IBM Corp., Entry Systems Division, PO Box 2989, Delray Beach, FL 33444.

#### Processor

4.77 MHz Intel 8088 16/eight-bit microprocessor, 8087 math coprocessor optional.

#### Keyboard

83 keys, IBM PC layout; 30-inch cord to system unit.

#### Memory

256KB RAM (expandable to 512KB), 40KB ROM.

#### Disk Drives

One or two 360KB (double-sided, double-density) half-height drives.

#### Video Display

Nine-inch (diagonal) monochrome amber monitor, 80 or 40×25 text, 320 or 640×200 graphics.

#### Input/Output Ports

Disk drive adapter; color/graphics monitor adapter; five available expansion slots.

#### Power Requirements

115 or 230V ac, 50 or 60 Hz.

#### Physical Characteristics

20 inches long, 17 inches wide, eight inches high; approximately 30 pounds.

#### Price

\$2595 (one drive), \$3020 (two drives).



## Commodore

### RS232 ADAPTER FOR VIC-20 AND COMMODORE 64



The JE232CM allows connection of standard RS232C printers, modems, etc. to your VIC-20 and C-64. A 4-pole switch allows the inversion of the 4 control lines. Complete installation and operation instructions included.

• Plugs into User Port • Provides Standard RS232C signal levels • Uses 6 signals (Transmit, Receive, Clear to Send, Request to Send, Data Terminal Ready, Data Set Ready).

**JE232CM . . . . . \$39.95**

### VOICE SYNTHESIZER FOR APPLE AND COMMODORE

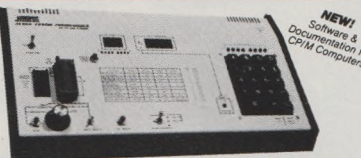


• Over 250 word vocabulary affixes allow the formation of more than 500 words • Built-in amplifier, speaker, volume control, and audio jack • Recreates a clear, natural male voice • Plug-in user ready with documentation and sample software • Case size: 7 1/4" L x 3 3/4" W x 1-3/8" H

**APPLICATIONS:** • Security Warning • Telecommunication • Teaching • Handicap Aid • Instrumentation • Games

The JE520 VOICE SYNTHESIZER will plug right into your computer and allow you to enhance almost any application. Utilizing National Semiconductor's DIGITALIZER™ Speech Processor IC (with four custom memory chips), the JE520 compresses natural speech into digital memory, including the original inflections and emphases. The result is an extremely clear, natural vocalization.

Part No.	Description	Price
JE520CM	For Commodore 64 & VIC-20	\$114.95
JE520AP	For Apple II, II+, and IIe	\$149.95



### JE664 EPROM PROGRAMMER

**8K to 64K EPROMS — 24 & 28 Pin Packages**  
Completely Self-Contained — Requires No Additional Systems for Operation

• Programs and validates EPROMs • Checks for properly erased EPROMs • Emulates PROMs or EPROMs • RS232C Computer Interface for editing and program loading • Loads data into RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • Compares EPROMs for content differences • Copies EPROMs • Power input: 115VAC, 60Hz, less than 10W power consumption • Enclosure: Color-coordinated, light tan panels with molded end pieces in mocha brown • Size: 15 1/4" L x 8 1/4" D x 3 1/4" H • Weight: 5 1/2 lbs.

**JE664-A EPROM Programmer . . . . . \$995.00**  
Assembled & Tested (includes JM16A Module)

**JE665 — RS232C INTERFACE OPTION** — The RS232C interface option implements computer access to the JE664-A RAM. This allows the computer to manipulate, store and transfer EPROM data to and from the JE664. A sample program listing is supplied in BASIC for CP/M computers. Documentation is provided to adapt the software to other computers with an RS232C port. 9600 Baud, 8-bit word, odd parity and 2 stop bits.

FOR A LIMITED TIME A SAMPLE OF SOFTWARE WRITTEN IN BASIC FOR THE TRS-80™ MODEL I, LEVEL II COMPUTER WILL ALSO BE PROVIDED.

**JE664-ARS EPROM Prog. w/JE665 Option . . . . . \$1195.00**  
Assembled & Tested (includes JM16A Module)

**EPROM JUMPER MODULES** — The JE664-A JUMPER MODULE (Personality Module) is a plug-in module that pre-sets the JE664 for the proper programming pulses to the EPROM and configures the EPROM socket connections for that particular EPROM.

JE664-A JUMPER MODULE	EPROM	Programming Voltage	Manufacturer	Price
JM06A	2708	25V	AMD, Motorola, Nat. Int., TI	\$14.95
JM16A	2716, 2716S, 2716 (T)	25V	Int., Motorola, Nat. Int., TI, AMD, Hitachi, MosTek	\$14.95
JM16B	27216 (S-V)	5V, +5V, +12V	Motorola, TI	\$14.95
JM32A	27252	25V	Motorola, TI, Hitachi, OKI	\$14.95
JM32B	2732	25V	AMD, Fujitsu, NEC, Hitachi, Int., Mitsubishi, National	\$14.95
JM32C	2732A	21V	Fujitsu, Int.	\$14.95
JM64A	MC68016A, MC68016A	21V	Motorola	\$14.95
JM64B	2764	21V	Int., Fairchild, OKI	\$14.95
JM64C	2764	25V	TI	\$14.95

## ProModem 1200

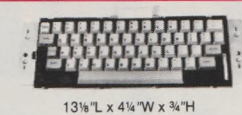


### Intelligent 300/1200 Baud Telephone Modem with Real Time Clock/Calendar

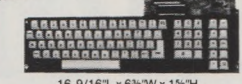
The ProModem™ is a Bell 212A (300/1200 baud) intelligent stand-alone modem • Full featured expandable modem • Standard features include Auto Answer and Auto Dial, Help Commands, Programmable Intelligent Dialing, Touch Tone™ and Pulse Dialing & More • Hayes command set compatible plus an additional extended command set • Shown w/alphanumeric display option.

**PM1200 . . . . . \$375.00**

## KEYBOARDS

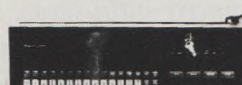


13 1/8" L x 4 1/4" W x 3/4" H

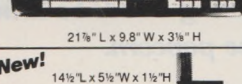


16-9/16" L x 6 1/2" W x 1 1/8" H

**Nationally Known Manufacturer!**



21 1/8" L x 9 8/16" W x 3 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H

### Mitsumi 54-Key Unencoded Matrix All-Purpose Keyboard

• SPST keyswitches • 20 pin ribbon cable connection • Low profile keys • Features: cursor controls, control, caps (lock), function, enter and shift keys • Color (keycaps): grey • Wt.: 1 lb. • Pinout included

**KB54 . . . . . \$14.95**

### 76-Key Serial ASCII Keyboard

• Simple serial interface • SPST mechanical switching • Operates in upper and lower case • Five user function keys: F1-F5 • Six finger edge card connection • Color (keys): tan • Weight: 2 lbs. • Data incl.

**KB76 . . . . . \$29.95**

### 106-KEY 8-BIT SERIAL ASCII KEYBOARD

• The terminals were designed to be daisy chained around a central host computer and used as individual work stations • Half effect switching • numeric and cursor keypad • 10 user definable keys • 50' interface cable with 9-pin sub-miniature connector • 7 LED function displays • Security lock • N-key rollover • Automatic key repeat function • Color: (case): white w/black panel—(key caps): grey and blue • Weight: 6 1/2 lbs. • Data included.

**KB139 . . . . . \$59.95**

### 68-Key Keyboard with Numeric Keypad for Apple II and II+

• Plugs directly into Apple II or II+ motherboard with 16-pin ribbon cable connector • 26 special functions • Color (keys): white/grey • Weight: 2 lbs.

**KB-A68 . . . . . \$89.95**

## POWER SUPPLIES



14 1/8" L x 5 1/2" W x 1 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H



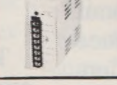
14 1/8" L x 5 1/2" W x 1 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H



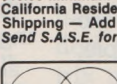
14 1/8" L x 5 1/2" W x 1 1/8" H



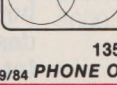
14 1/8" L x 5 1/2" W x 1 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H



14 1/8" L x 5 1/2" W x 1 1/8" H

### TRANSACTION TECHNOLOGY, INC.

#### 5VDC @ 1 AMP Regulated Power Supply

• Output: +5VDC @ 1.0 amp (also +30VDC regulated) • Input: 115VAC, 60 Hz • Two-tone (black/beige) self-enclosed case • 6 foot, 3-conductor black power cord • Size: 6 1/2" L x 7" W x 2 1/4" H • Weight: 3 lbs.

**PS51194 . . . . . \$14.95**

### Power/Mate Corp. REGULATED POWER SUPPLY

• Input: 105-125/210-250 VAC at 47-63 Hz • Line regulation: ±0.05% • Three mounting surfaces • Overvoltage protection • UL recognized • CSA certified

**Part No. Output Size Weight Price**

**EMAS/6B** 5V @ 3A/6V @ 2.5A 4 1/8" L x 4" W x 2 1/8" H 2 lbs. \$29.95

**EMAS/6C** 5V @ 6A/6V @ 5A 5 1/8" L x 4 1/8" W x 2 1/8" H 4 lbs. \$39.95

### POWER SUPPLY +5VDC @ 7.6 AMP, 12VDC @ 1.5 AMP SWITCHING

• Input: 115VAC, 50-60Hz @ 3 amp/230VAC, 50Hz @ 1.6 amp • Fan volt./power supply select switches (115/230VAC) • Output: 5VDC @ 7.6 amp, 12VDC @ 1.5 amp • 8 foot black power cord • Size: 11 1/4" L x 13 1/4" W x 3 1/4" H • Weight: 6 lbs.

**PS94VOS . . . . . \$39.95**

### KEPCO/TDK 4-OUTPUT SWITCHING POWER SUPPLY

• Ideal for disk drive needs of CRT terminals, microcomputers and video games • Input: 115/230VAC, 50/60Hz • Output: +5V @ 5 Amp, +12V @ 1.8 Amp, +12V @ 2 Amp, -12V @ 0.5 Amp • UL recognized • CSA certified

• Size: 7 3/4" L x 6 3/16" W x 1 1/8" H • Weight: 2 lbs.

**MRM 174KF . . . . . \$59.95**

### POWER PAC INC. REGULATED POWER SUPPLY

• Perfect for computer systems • Output: +5VDC @ 11 Amps, -5VDC @ 1 Amp, +12VDC @ 2 Amps, -12VDC @ 0.5 Amp and +24VDC @ 3 Amps • Over-voltage protection • Size: 12 1/2" L x 6 1/2" W x 4 1/8" H • Weight: 17 lbs. • Spec incl.

**PS2922 . . . . . \$69.95**

### 4-CHANNEL SWITCHING POWER SUPPLY

• Microprocessor, mini-computer, terminal, medical equipment and process control applications • Input: 90-130VAC, 47-440Hz • Output: +5VDC @ 5A, +5VDC @ 1A, +12VDC @ 1A, -12VDC @ 1A • Line regulation: ±0.2% • Ripple: 30mV p-p • Load regulation: ±1% • Overcurrent protection • Adj: 5V main output ±10% • Size: 6 1/2" L x 1 1/2" W x 4-1/16" H • Weight: 1 1/2 lbs.

**FCS-604A . . . . . \$69.95 each**

### Switching Power Supply for APPLE II, II+ & IIe™

• Can drive four floppy disk drives and up to eight expansion cards • Short circuit and overload protection • Fits inside Apple computer • Fully regulated +5V @ 5A, +12V @ 1.5A, -5V @ 5A, -12V @ 5A • Direct plug-in power cord included • Size: 9 1/8" L x 3 1/2" W x 2 1/4" H • Weight: 2 lbs.

**KHP4007 . . . . . \$79.95**

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### NEW! The EDU-LINK Learning Kit



The EDU-LINK fiber optic system is a low-cost, TTL compatible data transmission system designed specifically as an educational tool for students and engineers working in many different industries. Includes: transmitter PCB, a receiver PCB, one meter of plastic optical fiber, and all the necessary electrical hardware • Complete step-by-step instructions, theory of operation, and tutorial information are included.

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## APPLE ACCESSORIES



### 5 1/4" APPLE™ Direct Plug-In Compatible Disk Drive and Controller Card

The ADD-514 Disk Drive uses Shugart SA390 mechanics — 143K formatted storage • 35 tracks • Compatible with Apple Controller & ACC-1 Controller • The drive comes complete with connector and cable — just plug into your disk controller card • Size: 6" L x 3 1/2" W x 8-9/16" D • Weight: 4 1/2 lbs.

**ADD-514 (Disk Drive) . . . . . \$195.95**

**ACC-1 (Controller Card) . . . . . \$ 59.95**

**Also Available...**

**JE864 (80 Col. + 64K RAM for IIe) . . . . . \$124.95**

**JE614 (Numeric/Aux. Keypad for IIe) . . . . . \$89.95**

**F051APC (Apple Compat. 1/2-Ht. Drive) . . . . . \$209.95**

### INDUSTRIES Protect Yourself... DATASHIELD® Surge Protector

• Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss • 6 month warranty • Power dissipation (100 microsecond): 1,000,000 watts • 6 sockets • 6 foot power cord • Normal line voltage indicator light • Brown out/black out reset switch • Weight: 2 lbs.

**Model 100 . . . . . \$69.95**

### Protect Yourself... DATASHIELD® Back-Up Power Source

Provides up to 30 minutes of continuous 120 VAC 60Hz power to your computer system (load dependent) when you have a black out or voltage sag • Output rating: 200 watts • Six month warranty • Weight: 24 lbs.

**Model 200 (PC200) . . . . . \$349.95**

For more demanding systems (e.g. with hard disks) • Output rating: 300 watts

**XT300 . . . . . \$489.95**

### IBM MEMORY EXPANSION KIT COMPAQ COMPATIBILITY

#### SAVE HUNDREDS OF \$\$\$ BY UPGRADING MEMORY BOARDS YOURSELF!

Most of the popular memory boards allow you to add an additional 64K, 128K, 192K, or 256K. The IBM64K Kit will populate these boards in 64K byte increments. The kit is simple to install — just insert the nine 64K RAM chips in the provided sockets and set the two groups of switches. Directions are included.

**IBM64K (Nine 200ns 64K RAMs) . . . . . \$49.95**

### TRS-80 MEMORY EXPANSION KIT

**TRS-80 to 16K, 32K, or 48K**

**\*\*Model 1 = From 4K to 16K Requires (1) One Kit**

**Model 3 = From 4K to 48K Requires (3) Three Kits**

**Color = From 4K to 16K Requires (1) One Kit**

**\*\*Model 1 equipped with Expansion Board up to 48K Two Kits Required — One Kit Required for each 16K of Expansion —**

**TRS-16K3 \*200ns for Color & Model III . . . . . \$12.95**

**TRS-16K4 \*250ns for Model I . . . . . \$10.95**

### TRS-80 Color 32K or 64K Conversion Kit

Easy to install kits come complete with 8 ea. 4164-2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D, E, ET, F and NC circuit boards to OS-9.

Also converts TRS-80 color computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

**TRS-64K2 . . . . . \$44.95**

## UV-EPROM Eraser

**8 Chips — 51 Minutes**



**1 Chip — 37 Minutes**

Erases 2708, 2716, 2732, 2764, 2516, 2532, 2564. Erases up to 8 chips within 51 minutes (1 chip in 37 minutes). Maintains constant exposure distance of one inch. Special conductive foam liner eliminates static build-up. Built-in safety lock to prevent UV exposure. Compact — only 9.00" x 3.70" x 2.60". Complete with holding tray for 8 chips.

**DE-4 UV-EPROM Eraser . . . \$79.95**

**UVS-11EL Replacement Bulb . . . \$16.95**



# Comdex: How I Spent My Spring Vacation

*Comdex/Spring, a rite of passage for micro enthusiasts, wasn't much different than Comdexes past, but as always a few companies featured interesting products. Senior Writer Eric Grevstad has prepared a slide presentation that highlights Comdex/Spring 1984. So draw the curtains and break out the popcorn.*

By Eric Grevstad  
Senior Writer

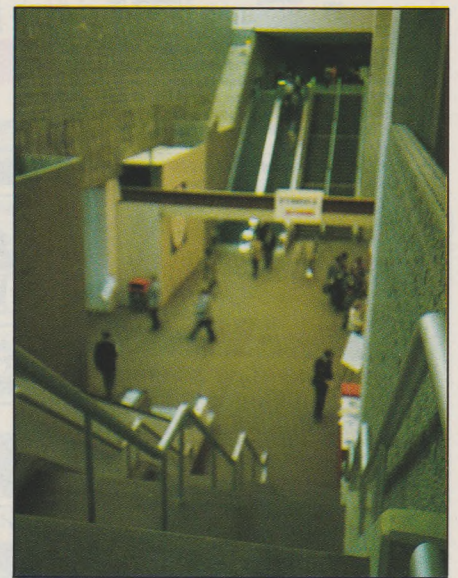
Okay, ready? Can everybody see the screen? These are the pictures Editor-in-Chief Keith Thompson and I took in Atlanta, when we went to Comdex/Spring May 22–25. Can somebody get the lights?



Blue suede shoes

Uh, I was loading the camera here; this is the floor of our room at the Hyatt. You can see my feet there. I should say at the beginning that this was the fourth spring Comdex; the sponsors, The Interface Group, started it a couple of years after the first Comdex/Fall in Las Vegas in 1979.

And it's still a smaller show. About 850 companies rented exhibit space in the Georgia World Congress Center, Atlanta Merchandise Mart or Apparel Mart, and about 50,000 people spent four days seeing the sights. It's hectic, but Comdex/Fall is worse—three times as many booths, seven locations, physically impossible to see more than half of it. Bad people, when they die, go to Comdex/Fall.



Staircase, World Congress Center

These are the stairs going down to one of the show floors; the World Congress Center is a nice place for conventions but tunnels into the ground for four levels of halls and escalators. It's like the Atlanta airport, where I made the mistake of not taking the subway.

To some extent, all Comdexes are alike. There are shuttle buses to the hotels and exhibitors trying to sign up dealers for their products, the same Interface Group daily newspaper





proclaiming "Show shatters shakeout myth" and some promising new little companies tucked in among those with crummy products you know won't see Christmas.

The problem with Comdex, besides being too big, is that there are no real people and few real products. Since it's a trade show, the emphasis is on profit margins and company support rather than users' experiences; Columbia Data Products' public relations agency lured me to breakfast to see "a new product" (the woman on the phone specifically said yes when I asked, "A new computer?") only to show me its new ad campaign and a pep-talk videotape for retailers.

As for real products, advanced introductions are the curse of Comdex. Some things on display were actually for sale and others promised to reach shelves by late summer, but it takes some items a year to go from Comdex to the corner store.

Such delays, plus a madly expanding schedule of more Comdexes and Softcons and other exhibits every year, have started the newest trend in computer shows—staying home. Apple, Commodore, Microsoft, Digital Research and Sorcim skipped Atlanta, and Lotus won't go to Las Vegas this November. Properly done shows are a chance to see next season's micros and software, but the show-burn-out backlash is gaining momentum.

However, nearly every show has some interesting exhibits. This is the hall Hewlett-Packard rented off the main lobby; the new HP-110 portable attracted lots of interest, and HP won almost as much applause for its printers.



Testing the HP-110

Besides the \$495 ThinkJet, there was the new LaserJet—the laser engine of Canon's LBP-CX, first shown at last November's Comdex, wrapped in a \$3495 package that delivers eight high-quality pages per minute. If plug-in cartridges for different typefaces aren't enough, the quiet HP also handles fancy graphics (its 300×300 dots per inch resolution puts dot-matrix models to shame). A disposable printing cartridge (\$99) should last for 3000 pages.



Otrona 2001

The HP-110 was arguably the machine of the show (as, say, the Tandy 2000 was at Comdex/Fall '83), but there were at least two challengers with different approaches to the problem of combining portability and PC compatibility. Here's a nice picture—I didn't take this, to be honest; it's from the press kit—of Otrona's 2001, a 19-pound transportable with a tiltable amber screen, 128KB RAM and one or two disk drives (with one drive, it's \$2495).

Otrona claims the 2001 is 100 percent PC compatible, not to mention expandable with options like a 10MB hard disk, an internal modem and 8087 math or Z80B CP/M chips. If the seven-inch screen gives you a headache, you can take it out (replacing it with a lockable "disk vault" to store floppies) and put a regular monitor on top.



The Morrow exhibit was full of mannequins in odd poses, wearing the same gray slacks and red sweaters as the live salespeople. They were carrying Comdex's other new compatible, the ten-pound Morrow Pivot.

The Pivots on display weren't quite finished—there were stick-on labels over the function keys and the ROM software icons weren't ready; Morrow promises delivery in August—but they looked intriguing. The keyboard swivels down to prop up the system unit, which has a CMOS 80C86 chip, one or two skinny third-height drives and a 16×80 LCD display (I asked a salesman about the blank space under the screen, suitable for eight more display lines, and he said, "That is interesting, isn't it?").



Morrow Pivot

Standing on your desk, the Pivot is a \$2500 (128KB, one drive) clock/calendar; its 480 × 128 pixels show a cute map of the world, on which you can move the cursor to read different times. Pressing the computer icon turns the unit into an MS DOS micro; there's also a 300 bps modem and a calculator that you can use while in a program.



Selling furniture

This is... Keith took this one. This is a skeleton, one of the gimmicks people used to attract attention to their booth (there are always lots of chairs and computer furniture at these shows). Compared to Vegas, Atlanta was pretty modest and tasteful; there weren't as many bored, half-naked women standing around as models, though a couple of exhibitors hired local Scarlett O'Haras in hoop skirts.

It's always fun, in a sort of depressing way, to see all the tinsel and hoopla of Comdex: hourly comedy skits or singing commercials, Hank Aaron and Ernest Borgnine endorsing micros and software, "The Six Million Dollar Man" costar Richard Anderson reduced to videotaped appearances plugging AST Research plug-in boards.

And the presentations are a joy. I watched a woman in tuxedo and tie, who must have been poured into her slacks, deliver a spiel about Computers International Inc.'s Daisywriter printers—there's a terrifically fast 80 cps daisy wheel coming this fall—and end it with, "And if you have any questions, don't ask me. I don't know any more."



The view from TeleVideo

We climbed on top of the TeleVideo booth to take this one. TeleVideo had a big presence, as Comdex watchers say, with lots of PC compatibles and transportables and an office machine called the Personal Mini, which can run up to 16 workstations from an 80186-powered central unit with up to 512KB RAM and 80MB of hard disk storage.

Lots of other clone manufacturers were there too, of course; Texas Instruments' booth played a sort of rock song ("Dare to compare/With the same software"), and Eagle followed Sperry and Leading Edge with a high-speed (8 MHz) model, the Turbo PC. ITT is shipping its totally unoriginal clone at \$3528 with two drives and 256KB RAM, and the 10MB XT at a pricey \$5999.



New start-up firm

Here's the other firm besides HP to rent its own hall. Crowds passed through the AT&T suite looking for personal computers but saw only the firm's \$10,000-and-up 3B series of minis and superminis.



AT&T owns a quarter of Olivetti; the *Atlanta Constitution* reported during the show that the telephone titan would stick its label on a version of Olivetti's M24, a 16-bit IBM compatible, as well as two machines (one perhaps a briefcase portable) created by Santa Clara, CA's Convergent Technologies Inc. The Big Bell debut, the *Constitution* said, would come on June 26.

Post-Comdex, pre-June 26 gossip described the Olivetti unit, the AT&T PC 6300, as a 128KB clone with an 8 MHz 8086 CPU, standard parallel and RS-232C ports and improved resolution for graphics (640×400 pixels instead of 640×200). There'll be the usual choice of one or two 360KB disk drives or one floppy plus a 10MB hard disk as well as a 30-pound, two-drive transportable.



IBM Assistants

While this heavy artillery is pointing at the PC, IBM has started scaring everyone to death in the software arena: if the overpriced PC can become an industry standard, reasonably priced IBM-label software should fly off the shelves. A month before Comdex, Big Blue unveiled the \$300 DisplayWrite and \$200 PCWriter word processors, causing Leading Edge to slash its word processor from \$295 to \$200.

In Atlanta, IBM unwrapped its Assistant Series—updated, licensed versions of Software Publishing Corp.'s pfs:Write, File, Graph and Report programs plus a spreadsheet—at \$149 or less apiece. Leading Edge has since cut its word processor to \$100. The word "panic" comes to mind.

The IBM/pfs products were one of two developments in easy-to-use software; the other was Hayes Microcomputer Products' Please, a data-

base manager launched with such fanfare you could walk through the booth without knowing the company made modems. Please is a menu-driven DBMS that handles up to 99 fields (up to 2000 characters each) per record; it'll cost \$349.



Women's Ware

Speaking of menu-driven databases, here's the winner of *Microcomputing's* Comdex/Spring "It's a Bow-Wow" Award, named for Senior Technical Editor Jim Heid's phrase for the worst, least praiseworthy products: Women's Ware, Neon Software's patronizing and sexist attempt at "the first computer software for the modern woman." What is it? You guessed: a recipe database.

That's a bit unfair; the recipe program is only one of several based on the same database and filer (based, in turn, on the assumption that women need something easier and more limited than the pfs series). There are also budget, calendar and checkbook programs. Reminded that checkbook balancing is the universal cliché of something you don't need a computer for, Neon President Dwight Norwood said, "Actually, balancing a checkbook is a serious problem for an awful lot of people."

As Norwood mentioned every five minutes, Gloria Steinem contributed suggestions and revisions for Women's Ware ads (coming soon in *Vogue*, *Glamour* and *Cosmopolitan*). There are plans for Home Decorator and Beauty/Fashion Designer programs, in the same cute packages with little clothes hangers and a hand with red nail polish fondling a keyboard.

The Bow-Wow Award winner for hardware was more hapless than outrageous: Microsci's Havac, a 64KB, 40-column Apple II Plus clone designed to sell for \$850 with one disk drive and no monitor. Besides looking rather chintzy, it costs about what an 80-column Apple IIe with one drive and a monitor does.

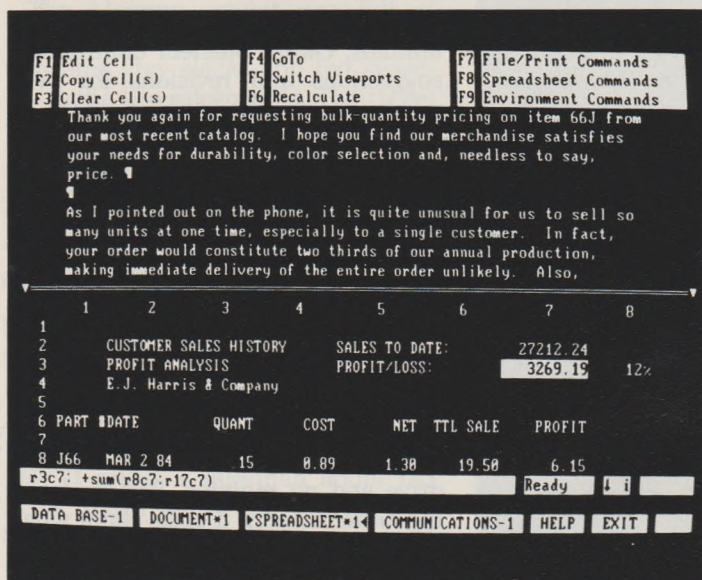


Comdex crowds

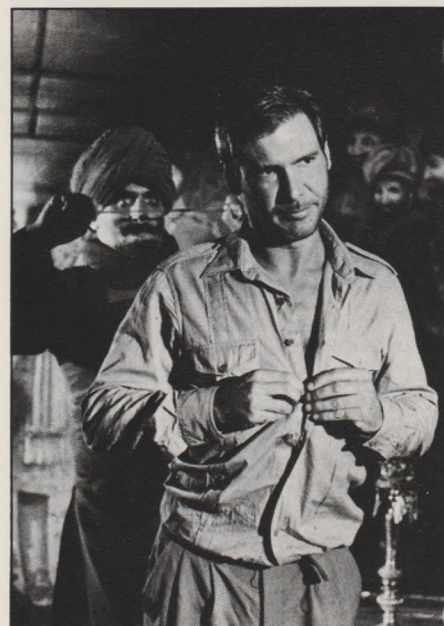
Even the Assistant Series (and a great color graphics adventure game for the PCjr called *King's Quest*) couldn't make IBM the software standout; that honor went to Ashton-Tate for the double-barreled introduction of dBase III and Framework. The former, at dBase II's old \$695 price, triples or quintuples most of that program's capabilities (databases open simultaneously, fields per record and so on) while being easier to use. dBase II is being cut to \$495 and sold as "the standard for eight-bit database management."

As for Framework, Ashton-Tate's integrated package looks like a formidable threat to the product shown in the next booth—Lotus Development Corp.'s *Symphony*. After a glance at both, I'd favor Framework as less intimidating to novice number crunchers: even using *Symphony's* word processor, you're in cell D7 or whatever of its giant spreadsheet.





Electric Desk



Indiana and assassin

Here's one of the better trends of Comdex: after Framework and Symphony (and the absent Ovation and VisiOn), we're used to thinking of integrated products that need mighty machines, with 512KB and a hard disk. But companies are starting to work on fitting such packages into smaller spaces.

Alpha Software Corp.'s Electric Desk looks a little busy (both the top and bottom three screen lines are filled with menus and prompts), but crams a word processor, spreadsheet, database manager and a communications program into 256KB and one floppy drive. That's the \$345 PC and XT version; there's also a 128KB model for PCjr (\$295).

I also saw an impressive demonstration of The Software Group's Enable, which costs more (\$695) but boasts the above four functions plus graphics, looks practically as slick as the repeatedly postponed Ovation, has neat interwindow and file transfer capabilities and, the publishers claim, runs with 192KB and two floppy disks. (I saw it, to be honest, on a hard disk, so I can't say how fast it runs on floppies.)



Mouse Systems' Paint

This is a neat-looking product from Mouse Systems: about two-thirds of MacPaint implemented with the company's mouse on the IBM PC. It seemed reasonably fast, did most of what the Macintosh program does and is supposed to be on sale by September or October.

In fact, with pop-up and pull-down windows rapidly appearing in PC software, Comdex/Spring showed IBMs and compatibles to be responding fast in the face of the Mac threat. Apple, as I said, wasn't there, and there were only half a dozen Mac programs (though Keith saw one slapdash all-typing, no-mouse adaptation of a mediocre PC package and one "Now Available for Macintosh" sign that meant "Now Taking Orders for October"). There were plenty of Mac hard disks and swivel stands and dust covers, though.

Finally, this is Harrison Ford buttoning his shirt while a valet holds his tie. Vendors' social events always vie for attention at Comdex: Lotus's buffet and cocktail party went until six a.m., and Innovative Software reserved a showing of *Indiana Jones and the Temple of Doom*, with free popcorn and Coke, the night after its premiere.

As the lights went down, the Innovative marketing guy got on the loudspeaker to welcome us and joked there'd be a short hour and a half demonstration of the company's software before the show, and we all booed and threw popcorn and were a rowdy crowd. The movie wasn't great, but there were a few interesting scenes amid the chaos.

Come to think of it, you could say the same for Comdex. ■



# The Comdex Menu

Edited by Amy Campbell

## No More Typing

The Omni-Reader, an optical character reader, drew interest from Comdex attendees, especially those whose typing talents rank below average. The device holds a page of typewritten text and includes a sliding slotted rule that guides a mouse-like reading head across each line of text.

Attached to an RS-232C serial port, the Omni-Reader can read text into most word processors and microcomputers. You manually scan the read head across one line of text at a time. It can read forward and backward at variable speeds.

It comes preprogrammed to recognize the most commonly used typefaces, and a typeface learning mode lets you teach it new fonts. For more information, contact Oberon International, McArthur Plaza, Suite 630, LB48, 5525 McArthur Blvd., Irving, TX 75062. Reader Service number 475.

## Success from Day One

Day One is a relational database system with an emphasis on "easy to use." As its name implies, Day One is designed to get you up and running on your personal computer in one day, even if you've never used a computer before. The package includes a tutorial disk, on-screen help and a toll-free help line.

The menu-driven program lets you define functions in



Database system Day One is geared for the first-time user.

English terms, such as "Describe Your File" and "Print Your Report." Utilities and vertical applications are also available. The package runs on an IBM PC or compatible, Tandy 2000, HP-150 and DEC Rainbow.

For more information, write Challenge Marketing, Goshen Professional Center, Suite 214, Falcon Bldg., West Chester, PA 19390. Reader Service number 476.

## Seequa Color Chameleon

Seequa Computer Corp. unveiled its 28-pound Color Chameleon, the first IBM- and

CP/M 80-compatible portable color microcomputer. With 384KB of RAM (expandable to 640KB), a nine-inch color monitor, dual 5¼-inch double-sided, double-density disk drives, an IBM-style keyboard, a real-time clock and serial and parallel ports, it sells for \$3595.

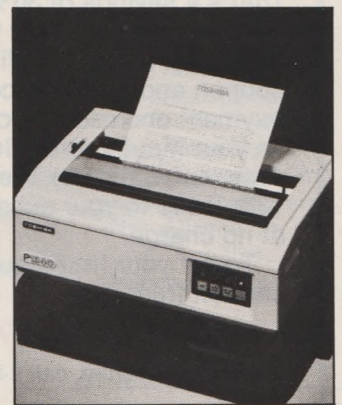
The Color Chameleon comes bundled with \$2300 worth of software, including WordStar, SuperCalc3, Perfect Writer, Perfect Calc and Condor I database as well as MS DOS, MBasic-86 and C-Term.

For more information, contact Seequa at 8305 Telegraph Road, Odenton, MD 21113. Reader Service number 477.

## Toshiba's 24-Pin Dot Matrix

Toshiba's latest printer boasts perfectly formed letter-quality characters at 54 characters per second as the result of its new 24-pin dot-matrix print head. The high-density print head uses an overlapping pattern from a print wire about twice the diameter of a human hair.

Model P1340 (\$995) is an 80-column printer. It produces draft quality text at 144 cps and handles graphics with a density of 180×180 dots per inch. The Centronics-compatible printer includes features such as underscores, bold type and super- and subscript capability as well as software-selectable fonts, pitches, line spacing, condensed print and proportional spacing.



Toshiba's P1340 24-pin dot matrix can produce letter-quality characters at twice the speed of most daisy wheels.



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Contact Toshiba America Inc., Information Systems Division, 2441 Michelle Drive, Tustin, CA 92680 for more information. Reader Service number 478.

## Apricot with Hard Disk

The recently introduced Apricot now comes with a 3½-inch Winchester disk, which features an 85 millisecond average seek time, and an intelligent disk controller with 8KB of disk buffering.

The Apricot xi (\$3995 for the 5MB version, \$4495 for the 10MB version without monitor) includes 256KB of RAM, three operating systems—MS DOS 2.0, CP/M-86 and Concurrent CP/M-86—and a 3½-inch Sony floppy disk drive with 315KB of storage. It comes bundled with SuperCalc and SuperPlanner.

Apricot's Manager software, geared for the novice, presents you with a clear menu of options, including a listing of available application programs with prompts on how to run them.

For further information, contact Applied Computer Techniques Inc., 3375 Scott Blvd., Suite 342, Santa Clara, CA 95051. Reader Service number 479.



Power and ease of use—the Apricot xi gives you both with a 3½-inch hard disk and menu-driven software.

## Hard Disk File Search

Select Information Systems introduced two notable software products for IBM PC, XT and compatible machines—4-1-1, a hard disk file retrieval system and Freestyle, an outline-based writing system.

4-1-1 (\$149), a content-based document locator that finds documents stored amongst hundreds of others on a hard disk system, works in conjunction with word processors and other document-creation systems to automatically maintain a database of every word used in every document.

Using a spreadsheet-style form, you search for a particular document by specifying the word or words that might be found in the document.

Freestyle (\$295) integrates a line-drawing feature for charts or forms and an extensive outline capability with a full-function word processor. The outline processor, dubbed Outline Zoom, makes Freestyle the first writing tool that lets you create and use templates and writing guides. It creates an interactive relationship between the outline and the corresponding document text.

For more information on either product, contact Select



The Epson JX-80 produces high-quality printouts in seven colors with a one-to-one graphics ratio.

Information Systems, 919 Sir Francis Drake Blvd., Kentfield, CA 94904. Reader Service number 481.

## The Desk Organizer

Warner Software's The Desk Organizer (\$295) takes care of seven desk management functions. It files anything you want it to; dials the phone, retrieves phone numbers, and inserts access codes; writes and prints memos, letters and reports; calculates with a visual calculator and printout and stores and runs equations and formulas; transfers data automatically from mode to mode; organizes, alphabetizes, indexes and cross-references; and acts as an alarm clock/reminder.

The Desk Organizer coexists in memory with WordStar, Multiplan, Lotus 1-2-3, VisiCalc and virtually any other software program for the IBM PC.

For more information, contact Warner Software Inc., 666 Fifth Ave., New York, NY 10103. Reader Service number 482.

## Epson Prints Color Spectrum

The Epson JX-80 dot-matrix printer (\$800) prints in seven colors at a speed of 160 cps. A four-color ribbon includes black, yellow, magenta and cyan. To create violet, orange and green, the printer makes a double pass, combining two of the basic four colors.

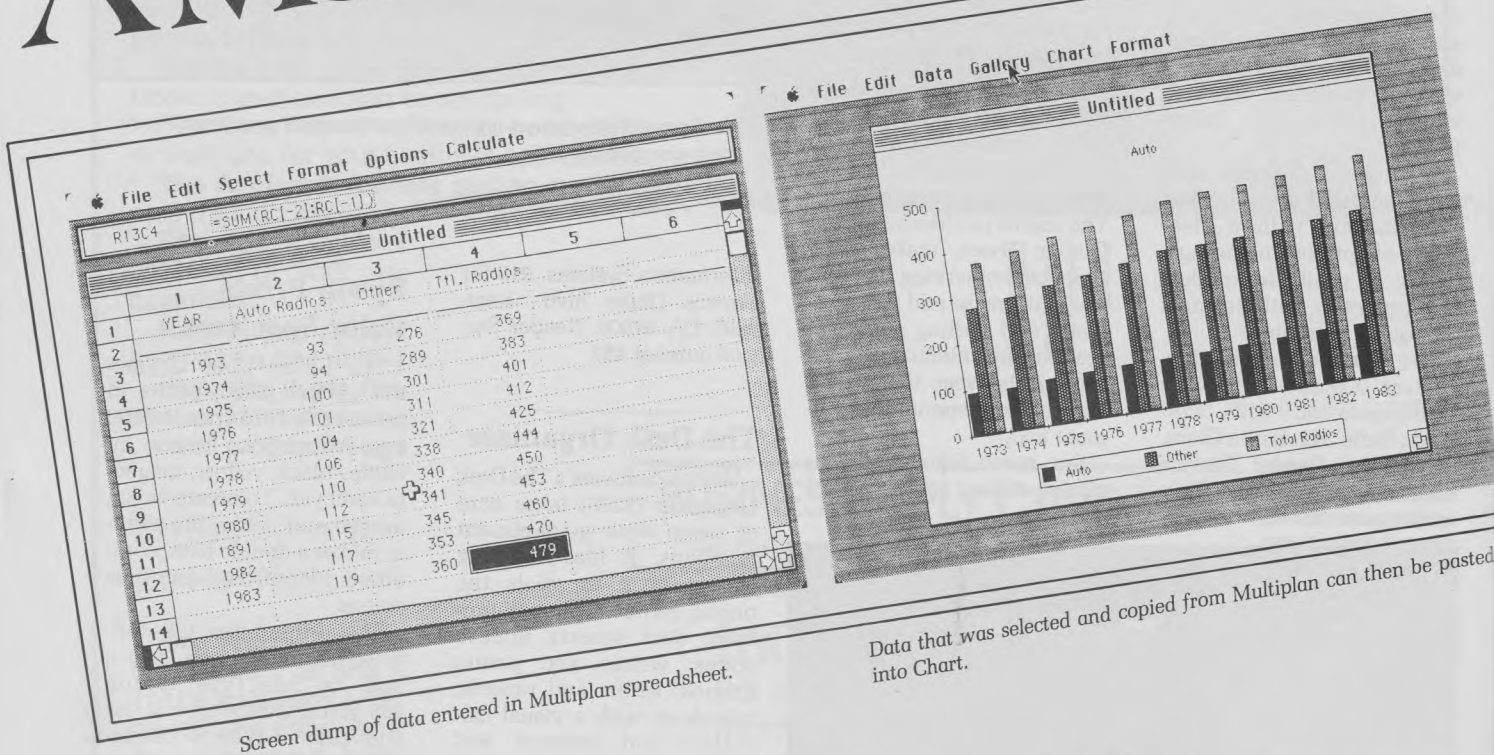
The printer has 128 software-selectable type styles, and its SelecType feature lets you combine type styles and colors. With a one-to-one graphics ratio, it produces accurate graphics, including circles.

For more information, contact Epson through Cinia Curran, The Bohle Company, 1901 Avenue of the Stars, Los Angeles, CA 90067. Reader Service number 480.

Microcomputing prints information on new products based on information supplied to us by manufacturers. Inclusion of a product does not signify an endorsement.



# A Mac Duet: Chart and



Screen dump of data entered in Multiplan spreadsheet.

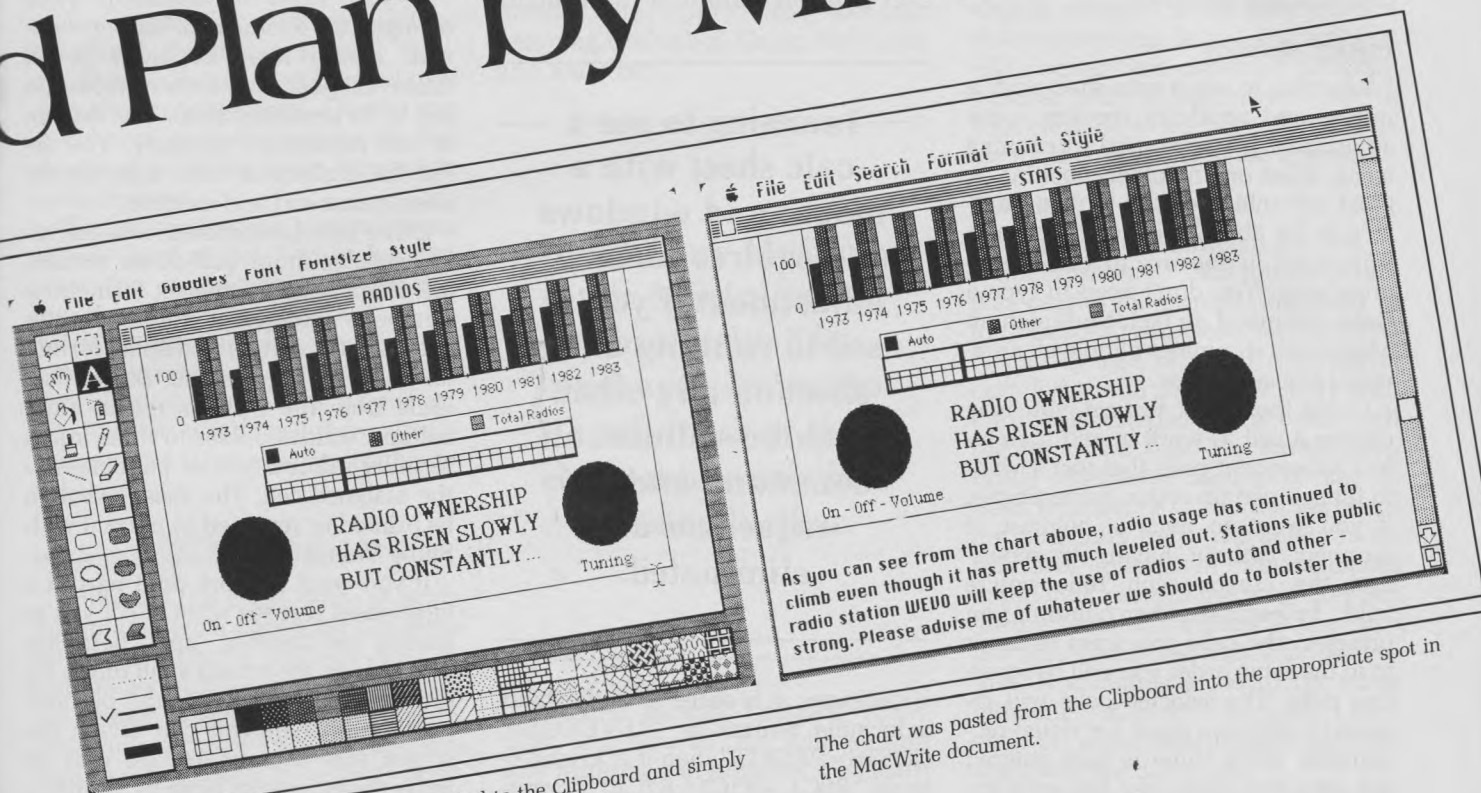
Data that was selected and copied from Multiplan can then be pasted into Chart.

*If you've been waiting for electronic spreadsheet and integrated graphics capabilities for your Macintosh, Microsoft has come to your rescue. Multiplan and Chart will let you create, manipulate and transfer data and charts on Mac.*

By Keith Thompson  
Editor-in-Chief



# and Plan by Microsoft



The chart created with Chart was copied to the Clipboard and simply pasted into a MacPaint window for embellishment.

The chart was pasted from the Clipboard into the appropriate spot in the MacWrite document.

If Apple sold 70,000 units within the Mac's first 100 days on the strength and promise of MacWrite and MacPaint, then the future course of the machine may be set by the likes of Microsoft's Multiplan and Chart.

## Great Combination

Each program is available separately and works alone. However, the combination of the two programs exceeds the capability of either one.

Multiplan and Chart can transfer data and graphics not only between themselves but also among other Macintosh applications. Moving data

between programs requires no DIF or other special disk formats. It's a simple matter to copy a selection into the Clipboard area and then paste it into another application. I'll illustrate this later when I create a Multiplan worksheet, paste it into Chart to graph it and then cut and paste it into MacPaint for embellishment, before finally using it in a MacWrite document.

## Multiplan

When you first boot Multiplan, you're greeted with a familiar Macintosh menu bar with some of the stan-

dard menu titles like the Apple, Edit and File. These are joined by other titles particular to Multiplan—Select, Format, Options and Calculate. Immediately below the menu bar is the formula bar.

The left side of the formula bar indicates what cell is being constructed or changed. When cells are constructed, any formulas that are input will appear in full in this bar. Below this bar is the title bar, which gives you the name of the document you're working on. Next is the spreadsheet itself. Anyone who has used a calculator will find the layout of the rows



and columns familiar. When you start Multiplan, you see six columns and 14 rows on a black-on-white screen. Each cell is cordoned off by light dots. These dots make it easy to see exactly what number is referenced by what row and column. A heavier dotted grid indicates page breaks. When loaded, the sheet is pre-configured to its maximum size of 63 columns and 255 rows.

### Instant Mobility

Learning to use a calc sheet with a mouse and windows requires some adjustment if you're used to running a calc sheet on any other machine. A great advantage of the mouse interface is its ability to move instantly from a cell in one area to a cell in another area. You don't need to type a Goto command. In fact, Multiplan on Macintosh eliminates almost all command key sequences.

Using the Select feature, you may choose a cell to work in and then select subsequent cells that you'll want to fill in a certain order. For example, if you want to enter a column of numbers without having to reposition the cursor each time you're ready to begin another column, you preselect the cells you want to input to in the same order you will be inputting data. The selected cells will reverse to white on black for visual recognition. Each value is then entered not with the return key but with the enter key. You can concentrate on entering data with reduced chances for error without having to move the cursor from the bottom of one column to the top of the next.

When a column width is too narrow, you point the cursor to the vertical line in the column header that separates the columns and press it while positioning the vertical line to the necessary width. Lifting your finger up from the mouse automatically widens the entire column. You may also change the column width by pulling down the format menu and entering a width value in the dialogue box. This is the most efficient way to change more than one column width at a time or make a global width change.

Rows and columns can be inserted by pointing to the row or column header, holding down shift and clicking once. All affected cells will refer back to the proper original cells. Rows and columns are deleted as easily by clicking once in the header and

then cutting as you would a MacWrite passage.

### Slick Features

Entering data is the same as in other versions of Multiplan. One of the slick features of Multiplan is its ability to assign names to rows and columns that are referenced by formulas. These names are then entered into formulas instead of row/column

---

**Learning to use a  
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---

coordinates. It is easier to understand a formula written as "REVENUE - COSTS = PROFIT" than it is to understand "R9C2 = R1C2 - R7C2." Formulas written in English make it easy to check for errors.

Using a scroll box, you can scroll through each of Multiplan's functions to choose the one you want. When selected, the function automatically pastes itself into the selected cell.

One of the best implementations of the Select feature is for copying cells. The range of the copy is selected by pointing to the first cell to be copied, pressing down the mouse button and moving the cursor to the opposite extreme of the area to be copied. Then, you pull down the edit menu and select Fill Right or Fill Down. Data from either the left column or top row immediately fills the rest of the selected area.

Copying a range of cells to another part of the spreadsheet is done with the Copy and Paste commands. If you make a mistake, you can select the Undo option and reverse your last action. Undo also works with most of Multiplan's other commands.

You can check on cell contents by selecting that particular cell, much like the standard Multiplan procedure. The contents of the cell appear along the top of the screen in the formula bar. If you want to change only part of the cell's contents, place the cursor on the section to be edited. Then, make the change with a cut, copy or paste.

If you need to abandon your changes, the formula bar has a prominent cancel icon displayed at all times. Clicking this icon restores the cell to its preedited state. You do other cell maneuvers similarly. You select the designated cells, then the desired command and execute.

Other calc procedures, conveniently available from pull-down menus, are aligning cell contents, formatting numbers and global column width changes. It's simple to display formulas in cells by selecting Show Formula from the Options menu. Each column width doubles to fit as much formula information as possible into the assigned cell. The sheet can then be printed or returned to normal with Show Values.

If you want to work on a part of a large sheet and see what effect you're having on another, split bars are available on the screen at all times. By dragging either the vertical or horizontal split bar, you can divide the screen into four panes. It's easy to move from pane to pane by positioning the cursor wherever you want it. Unfortunately, you can't freeze the panes. If you scroll the top pane of a sheet vertically by row, the bottom pane scrolls also.

One useful feature of Multiplan is the ability to protect a worksheet. You can view and print a protected worksheet, but you can't alter it. This is particularly useful when you need to guarantee the integrity of an intricate model or formula. The sheet can even be protected by assigning it a password so, if you desire changes, the proper password will unlock the sheet and you can make them.

The protected sheet will, however, allow designated cells to remain unprotected. This means that a worksheet, such as an annual budget, can be protected while actual month-to-month data is entered in designated cells. Variances and percentages of actual versus budgeted expenses and income can be calculated without accidentally altering more permanent information.



## Chain Link

Another powerful aspect of Multiplan is its ability to link worksheets together. You can select information from one sheet and copy it into the Clipboard for pasting into another sheet at any time. However, by formally linking one sheet to another, you can integrate other individual worksheets into a single master sheet. This is of benefit in situations where individual departments have separate financials that must be combined on a single master sheet. Or, you can calculate a payroll breakout on one sheet and bring the totals forward to another sheet.

This makes it easier to concentrate on one level of detail and also provides for confidentiality. Whenever the linked detail worksheet is required, Multiplan asks for the primary document and copies the necessary cells into the master worksheet. The master worksheet then always contains the latest changes to the detail sheets.

## Print It

Multiplan has a full range of printing options. No longer must you settle for simply printing out your sheet or elaborately positioning your sheet in the printer to achieve a particular effect. Pulling down Page Set Up, you choose a horizontal or vertical print-out of your sheet. Page break lines on the worksheet change according to how you define Print Set Up. You then have the option of changing column widths to determine how the printed sheet will look. You see these results on-screen before they're printed.

There is also space in Print Set Up to type in one-line headers and/or footers that can be formatted (left-center-right) and can include your text, page numbers, the time the sheet was printed or the date. You can check whether you want to print the row and column numbers or the gridlines. You can set any of the four page margins.

The Print command asks the print quality, page range and number of copies you wish to print. It also asks whether you wish to print the entire sheet or only select areas of the sheet. If you instruct Mac to print just your work area, the printed sheet will be centered on the page. Printing a worksheet using the high-quality option makes a readable and visually pleasing final copy. If speed is a fac-

tor, you can spin off copies using the draft-quality mode. There are some compromises in how the sheet is placed on the printed page.

## Consistent Design

Microsoft has designed its Macintosh manuals to be consistent with each other and with the manuals produced by Apple. The 172-page book is divided into three major sections: Learning Multiplan, Using Multiplan and Reference.

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**Would I buy Multiplan  
for Macintosh?  
Absolutely. The  
package carries the  
usefulness of the  
electronic worksheet  
one step further.**

---

The first section, Learning Multiplan, is a tutorial that will get you into Multiplan in minutes. You learn how to move about and perform basic functions within the program. Simple exercises ease you into the Mac environment. The section is a concise 31 pages.

The next section, Using Multiplan, describes all of the features in detail and explains how to perform various functions. Topics are printed in bold type in wide margins to make later reference easier.

The third section, Multiplan Reference, is easy to locate because it's printed on beige paper. The layout of this section deserves special note. Microsoft has followed the Macintosh user interface in its design. It has its own contents page that has an illustration of each of the program's pull-down menus in its most extended mode. Each pull-down menu on the contents page has an accompanying page number for quick reference to more detailed information within that section.

Multiplan is no exception to Microsoft's tradition of customer support. By returning the enclosed registra-

tion card to Microsoft, you have access to a help hot line at Microsoft. Also, within the 90-day warranty period, Microsoft will replace your defective disk. Finally, the company will notify you of product updates and offer special reduced prices for those upgrades.

If you're a registered owner of Multiplan version 1.00, you should have already received notification about a disk replacement from Microsoft that will contain the corrected program (version 1.02). If you haven't sent in your card, do so and you will be eligible for the company's free upgrade.

## Definite Yes

Would I buy Multiplan for Macintosh? Absolutely. Macintosh Multiplan carries the proven usefulness of the electronic worksheet tool one step further in ease of use. I can choose cells faster and more efficiently with the mouse interface than I can with regular cursor keys. The mouse practically eliminates having to key in slash commands. I use the keyboard for data entry only. The ability to select rows, columns or individual cells in different parts of the sheet and perform a function on them at one time is a time-saving and useful mouse feature. It encourages me to try many different "what-ifs" because I can click on a pull-down menu and immediately see the results.

I like being able to lock certain cells on my worksheet and keep open those cells I update more often. I also like the sophisticated format options available when it's time to print my worksheet.

Constructing worksheets with the mouse and windows does require some getting used to, though. The screen size allows less information to be viewed at once than a calc run on another machine. Not having asynchronous split screens compounds the problem. Perhaps in a future version, there will be a choice between synchronous and asynchronous windows.

If different typesizes were offered, more of a sheet could be seen at one time. Scrolling a sheet that exceeds the screen size is only moderately fast. Selecting cells in one screen and continuing to select cells in other, not visible, portions of the sheet requires holding the cursor against the border of the screen. The screen totally refreshes itself after every row or column scrolls into view from off-screen, a time-consuming process.



Multiplan was my first encounter with a protected program on Macintosh. You may copy the original disk to make a disk that runs Multiplan. However, the key always remains on the master disk. Thus, you need to use the master disk every time you boot Multiplan. With so many disk swaps necessary on Macintosh as it is, another series of swaps is a serious inconvenience. If you choose to keep your worksheets on a separate disk, you'll have three disks to juggle as you start your Multiplan. This protection scheme appears to have been added at the last moment, since the only mention of it is on a separate sheet inside the manual. I hope that Microsoft will at least reconsider this one.

## Chart

Chart (prerelease version .97) is a stand-alone business graphics package that makes full use of the Macintosh user interface, including dialogue boxes, windows and pull-down menus. It also makes maximum use of the mouse for editing as well as for altering segments of drawn graphs. You can begin using the program moments after it's been unwrapped. I drew my first graph without consulting the manual.

Chart is simple to start up and use, yet it's also a sophisticated tool that allows customization of almost every facet of graphmaking. The program has seven format options that can draw 42 differently formatted graphs. Each of the basic graphs is possible—area, bar, column, pie, scatter, line and combination—and each can be presented in various ways. If the built-in variety isn't enough, you can customize a chart to suit your own purposes.

## Menu Bar

Let's look at the range of options available from the menu bar. In addition to the familiar Accessory, File and Edit menus, four menus—Data, Gallery, Chart and Format—are particular to Chart.

The Data menu provides many options that speed up and simplify data entry. You can choose from Sequence, Date, Text or Number for the category. The Number category asks for a beginning number and then requests the increment between entries. You

can sort by either category or value after data is entered and before it's graphed or analyze a series of points.

The program computes either an average, cumulative sum, difference, growth, statistics trend or percent for a selected category or value. The analyzed list automatically becomes another series of data points ready for viewing or plotting. Since you can overlay graphs, trend computations can be a line graph overlaying actual data.

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The Gallery menu is a graphic depiction of each of the major graph formats. Miniature graphs appear showing each of the stock graph formats including the variations available with each one. To use any of these, just click on the type you want. Your graph is immediately drawn with your data according to the format you selected.

These two menus form the basis for using Chart. Data organizes the input of data; Gallery formats that data into standard graph formats. The remaining pull-down menus allow detailed customization of your chart. For example, you can add and position a legend, change the width of the axes or add arrows of different weights for emphasis. You can choose one type of chart to overlay another type for added emphasis.

The Format menu options align type, change line weights and change line and area patterns within graphs. If the default patterns for some graphs don't have sufficient contrast when printed, the pattern options make it possible to select the exact contrast you want. Another command adorns selected type, such as a chart title, with a ruled box with bev-

eled or rounded corners or shadowed rule. Format capabilities even include the angle of the first slice in a pie chart. You can also select individual pieces of the pie and move them into another position on the screen. In short, almost every element in your presentation can be changed.

## Window View

A screen with a large inactive window and a smaller active window, called New Series, greets you a few seconds after you open Chart. This New Series window is where you enter data or, if porting data from Multiplan, you execute Paste for a transfer from previously copied spreadsheet data to move from the Clipboard to Chart.

If you require multiple data series, Chart will form New Series windows. For convenience, Chart titles each new series with the current time. Later you can retile them for your own purposes. After you enter all of your data, you need only click the larger inactive window to have your graph drawn. The series windows lie beneath the chart window for ready access.

Printing a graph uses the same specification menu as Multiplan does. You can change the default margins and decide whether you want the printout to be horizontal or vertical. A header and/or footer will imprint the time the chart is printed, the date or any other information that will fit on a line. Chart doesn't make a literal print of what you see on the screen—it recalculates your graph proportionately to fit on the printed page according to the parameters you designate in the print set-up menus.

## Possible Link

One of Multiplan's strong features is its ability to link one worksheet to another; Chart shares this attribute. Information that must be regraphed from an updated Multiplan spreadsheet can be linked permanently to the spreadsheet. When you command Chart to draw the graph, it will ask you to load the Multiplan document. Then, following the format specifications that you originally entered, Chart extracts the desired updated information and plots it.

Chart is a perfect example of data transportability between Macintosh application tools. For example, after you extract data points from Multiplan







**"Where can I get a financial  
to act on this stock**

***"Where can  
I find the latest  
news and quotes  
on the top stocks  
in the  
aerospace industry  
in time for  
the three o'clock  
meeting!"***

**"How am  
so I can**

**"How can  
if the  
at this**

**"What you need is a little Straight Talk.<sup>TM</sup>"**



profile in time  
I've been chasing?"

I going to research the Norman Conquest  
finish this term paper by tomorrow?"

I find out  
Mets won  
time of night?"

Macintosh™ has changed our concept of what it's like to use a personal computer.

Straight Talk, from Dow Jones Software, changes the concept of how a personal computer can be used.

Straight Talk gives you the exact information you

need, anytime you need it, right on your desk. Straight Talk takes advantage of the functions Macintosh is famous for, allowing you to store and process information from Dow Jones News/Retrieval® and other remote database services. You can do research, write reports, send electronic mail — even buy a tennis racquet.

Dow Jones Straight Talk.™ No Macintosh should be without it.

For more information see your dealer or call  
**1-800-345-8500,  
ext. 272**

**Dow Jones**  
**Software™**

Circle 53 on Reader Service card.



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# ***Straight Talk On the Mac***

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By Shawn Bryan

**T**his is the story of Straight Talk, a communications program for Apple's Macintosh, as told to me by Tom Evslin, president of Solutions Inc., the Montpelier, VT-based software house that developed the package. It's a story that conveys the difficulties encountered by companies developing Mac software during the machine's infancy, a story of obscure operating system bugs, sketchy documentation and unfamiliarity with a new and very different computer. Finally, it's a story of an exceptionally talented programmer, Tom Evslin, and how he exterminated the bugs and turned out a quality product.

## **In the Beginning...**

When Apple introduced the Mac, MacWrite and MacPaint were the only programs available. Many software houses had received prototype units, but even as the Mac was being introduced to the public, changes were being made in the system as bugs were discovered and corrected. (Legend has it that the debugging process stopped only two hours before the operating system disks were to be duplicated.)

The Mac was developed quickly, and Apple's software support side had a hard time keeping up with the hardware side. As a result, the devel-

opment systems available for the Mac (which run on the Lisa) were documented as much by memoranda and telephone conversation notes as they were by formally published specifications. The pressure at Apple was to get the Mac out—not to provide polished documentation for developers. Furthermore, the mainframe-like development system introduced many new concepts to micro software developers, who had to learn a whole new style of programming before they could actually begin to turn out software.

## **Solutions Enters the Scene**

At the same time that Apple was releasing the Mac, Solutions Inc. was wrapping up a contract with Dow Jones Software for a now-popular communications program called the Dow Jones Spreadsheet Link (Link, for short). A menu-driven program that simplifies connection to the Dow Jones News/Retrieval Service, Link lets you download stock information automatically from DJNS in formats that can be used by most spreadsheets. The Link eliminates the typing chores associated with getting current quotes into your spreadsheet.

The people at Dow Jones had a prototype Mac for some time and decided that they wanted a Mac version

of the Link. In January, Dow asked Evslin if he could convert the Link to the Mac in time to have a demo available for Softcon, scheduled to be in February. Evslin thought he could, although he had never worked with the Mac or the Lisa before.

Dow Jones offered Evslin its Lisas and development system software on the spot. Since Evslin had flown to New York for his meeting, he rented a car that night and drove back to Vermont with a load of Lisas and the associated development system documentation in the back. Thus began what was to be a hectic month.

At first, it seemed that porting the Link to the Mac would be a simple task. But as Evslin began to understand the workings of the Mac, he realized that simply porting the program to the Mac wouldn't suffice. The Mac's specialties are its ease of use, its mouse and its stunning graphics. Pull-down menus and icons grace its screen. Simply converting the Link to the Mac would mean ignoring the Mac's potential. Evslin wanted to exploit the machine's power and to use the icons, the pull-down menus and the mouse in the Link's Mac version.

As Evslin began work on the Mac version, two more things became clear. First, the people at Dow Jones



*The story you are about to read is true. It involves Tom Evslin, a programmer who developed the Straight Talk communications program for Macintosh. Our story recounts the events leading to the completion of the product and conveys the difficulties encountered by Macintosh software developers.*

who had given the Lisa development systems to Evslin had either not received or not kept all of the documentation changes. Second, and even more critical, Apple had clearly not completed debugging the Mac.

As he wrote code on the Lisa and downloaded it to the Mac for testing, Evslin began to find bugs in the system that Apple hadn't yet found, and some that Apple had found but had not yet documented (see the sidebar "MacBugs: Up Close and Personal").

#### The Clock Ticks

Let's take a look at the schedule. The Mac was first publicly displayed in January 1984. Softcon was in February 1984. Evslin actually brought home the Lisas and the development system for the Mac at the end of January, so he had two short weeks to learn a new, undocumented operating system, convert the menu-driven Link to a mouse-driven Link, and have a version running for Softcon. The month of February became a blur of activity, but the result was a running demo of the Spreadsheet Link at Softcon.

It was also at Softcon that Evslin first met face to face with Alan Rossman and Guy Kawasaki, two stalwarts at Apple who did much of the technical assisting. Kawasaki and Rossman liked the demo of Link so



Tom Evslin works on porting the Link from Lisa to the Macintosh.

much that they took it over to the Apple booth and put it up on a big screen. They then videotaped Mary Evslin, Tom's wife and computer-phobic-turned-MacNut, using the Link at the Dow Jones booth. The tape with Mary using Link now goes to Mac dealers as part of a training package on the Mac.

With the Softcon milestone behind it, the company took a bit of a breather. Soon an idea that had been germinating with Evslin began to take hold and grow. Up until now, the thrust

of everyone's efforts was to get the Link running on the Mac. Evslin began to realize that the Link was a vertical market application with a fairly restricted audience. He was also keenly aware that the Mac had no communications software available and that the Apple communications package was still some time off. He decided that what was really needed was a terminal program for Mac, not just a Dow Jones package.

Quickly, Evslin modified the Link program to be more generic. He



added the ability to create script files in the Mac Scrapbook and Notepad that could be used to log-on to other systems besides Dow Jones.

### **Mouse + Mouse = Mess**

At first a skeptic about mice, Evslin is now a two-fisted mouser. With the Lisa and Mac side by side for development purposes, Evslin often finds himself mousing on both the Lisa and the Mac at the same time while he's debugging a program. Evslin came to realize that what makes a mouse unacceptable is having to constantly swap from keyboard to mouse and back again.

Evslin began to study the ergonomics of his program. He realized that when you started the log-on series for an information service, you were using the mouse to make your selections. Once the information service menus came up, however, you were forced to go to the keyboard to make selections. Why not use the mouse to make selections from the menus that appear on the screen? reasoned Evslin.

A little study of the editor functions of the Mac left Evslin with the realization that to use the mouse to make menu selections, all he would have to do would be to convert the editor conventions to his own use. In the Mac editor, you use the mouse to select information with one click and cut it out on the second click. Evslin set up the Mac so that you could point with the mouse to the menu selections as they scrolled onto the screen. Using the double-click convention he copied from the editor, Evslin set up a system whereby the first click selects the menu item and the second click activates it.

Any multiple-choice menu can be selected with the mouse by highlighting and clicking the menu number or letter. If you're a sloppy mouser (mousing, I have discovered, is a skill), Evslin's program will strip leading and trailing blanks from your selection. People familiar with the Mac editor will immediately be comfortable with this system. It also solves the problem of how to keep a person's hands on the mouse.

### **Next Step**

As soon as he had a working model

of his new idea, Evslin flew to New York to confer with the people at Dow Jones about it. He pointed out that the Spreadsheet Link program was targeted at a fairly narrow audience. He also pointed out the lack of a communications program for the Mac and suggested a much broader market would be available for a simple terminal package than for the Spreadsheet Link.

Evslin's suggestions did not fall on deaf ears. William Dunn, vice president at Dow Jones and man-in-charge of the News/Retrieval Service, immediately took a liking to Evslin's ideas and urged a speedy positive decision from the Dow Jones corporate staff.

Evslin quickly moved to complete work on what was to become Straight Talk. Evslin realized that the Mac graphics were so good that a professional artist would be needed to create screens that would measure up to

the system, and a graphics artist was brought in to do the screen design. Other flourishes were added to make the Link a terminal program that would work with more than one information utility. Soon what had been a single system, single purpose program was transformed into a general purpose communications program. (See the sidebar "A Look at the Program.")

### **The Future**

I spoke with William Dunn at Dow Jones about the company's plans for Straight Talk, and it turns out there may be some interesting things in its future. The Dow Jones News/Retrieval Service already has the ability to embed codes into its data transmissions. Evslin and Dow Jones are now studying how they can make use of these codes to send screen code to people using Macs and Straight Talk

## **A Look at the Program**

Straight Talk, as it exists today, is a terminal program for the Mac. It doesn't include all of the features found in some communications programs. However, Straight Talk is consistent with the Mac concept of ease of use.

When you begin Straight Talk, you're presented with a screen that offers your communications choices. For communications with Dow Jones, log-on is completely automatic. If you wish to use Straight Talk to communicate with other services, a minimum amount of advance setup is required. Using the radio-button technique developed by Apple, selection of communications services, modem types, telephone type and communications speed is all mouse-controlled. Once the system has been set up, communications is as simple as the click of a mouse.

### **Integration**

One of the things that makes Straight Talk so attractive is the way

in which Evslin has managed to integrate MacWrite and the Notebook into the communications program. If you're logging on to a service other than Dow Jones, you can record your usual log-on sequence in a text file created in MacWrite and send it to the information service you're using, once you've acquired the telephone line. This permits almost completely automatic log-on to any service you might use.

The protocols for Telenet, Tymenet and others are already known to Mac so you won't need to worry about setting up the system for those communications systems.

Text received during an on-line session can be passed directly to MacWrite for editing. Straight Talk features a FIFO (first in, first out) buffer. This buffer automatically captures your communications session, and you can go back at any time and retrieve the information that has already scrolled off the screen if you decide you need it.

Because of the way in which the



so the font that appears on the screen of the Mac for Dow Jones takes on a more appealing and legible font than that of the normal program.

These codes could be used to highlight in bold or larger type the important points or headlines in the information being transmitted. As Dunn succinctly points out, the Mac, with its bit-mapped screen, is the ideal way to start to make computer screens more competitive with the typeset word. The public would never tolerate books set in the type we tolerate on the computer display. Now there is no reason to put up with mediocrity.

Clearly, Dow Jones is aggressively tackling the software marketplace, with Bill Dunn spearheading the charge. The interesting thing is that it's doing so with a series of innovative programs for the most part created by smaller independent software

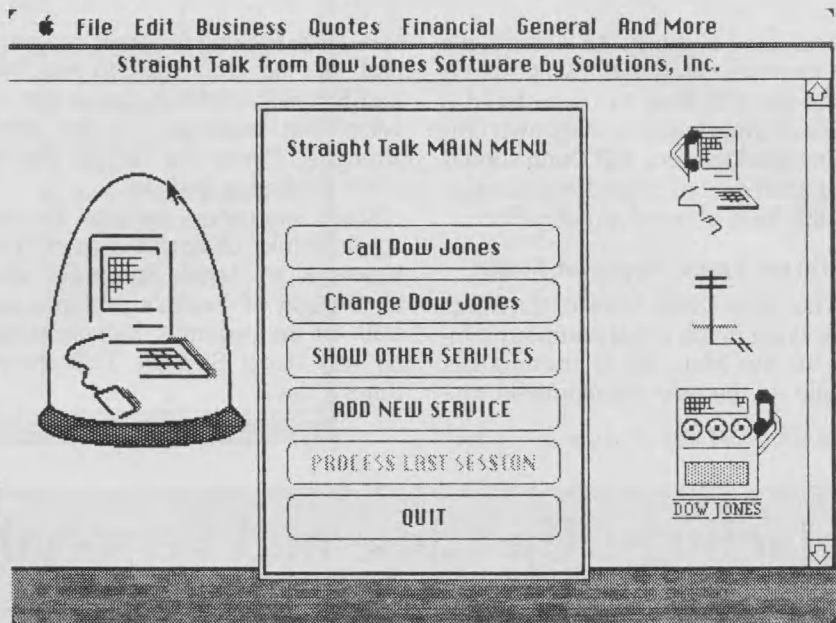


Fig. 1. Straight Talk main menu.

Mac memory manager allocates memory blocks, the buffer size available can change from one session to another. Should the buffer fill in within 4KB of its limit, the system stops and warns you that you're about to lose information. If you wish to save it, simply record the information to disk and continue with the session. Otherwise, you may simply continue with your communications as they were before you were interrupted.

### Easy Does It

Several other options are available with Straight Talk to make your communications session as easy as possible. You may select full- or half-duplex operation. The Mac normally scrolls a page of information at a time. If you're more comfortable with line-at-a-time scrolling, that feature can be selected. Straight Talk also has a wait-for-prompt mode that allows you to set up the program to recognize a character prompt from the host system

(like the > symbol transmitted by The Source). In this way, Straight Talk can respond to systems that transmit various characters not otherwise recognized by normal communications protocols.

Evslin calls Straight Talk a terminal program because it doesn't contain all the error-checking protocols that are used by many systems to verify transmission of complete files. Based upon my brief exposure to Straight Talk, I would say that the decision not to make Straight Talk any more complicated was probably a sound one. Many of the people who buy the Mac are buying their first computer. Many are people who have never considered a computer before. These people are not interested in Christiansen protocols or Xmodem protocols. They wish to be insulated from the system and the technical aspects of communications.

Straight Talk is a program that requires the barest essential information. If you know the telephone

number you need to call and the speed at which you are going to operate, you have enough information to make Straight Talk work. The only typing you have to do is to put the telephone number and your password into the system. Otherwise, everything is handled by mouse control.

### Numbers

How big is this program? At its maximum size, it takes up 30KB of your 128KB system. The entire program (core plus overlays) takes up 50KB on disk. The program is written in Pascal, which is compiled on the Lisa to machine code.

Straight Talk was in beta test in June. The expected final release date for the program was mid-July if all went well, so you may be able to buy Straight Talk at your local dealer. The crowning glory—Straight Talk, with all its art and technical innovation—will sell for a paltry \$79.

S.B.



houses like Solutions. As a result, it's getting more creative thinking than it might get if it were to try to build a stable of programmers in its own corporate headquarters. Bill Dunn should get a great deal of credit for encouraging this kind of development effort.

### **Evslin on Apple, Apple on Evslin**

What does Evslin think of the Mac? He is tying much of his company's future to the Mac. He is training his people on the Mac development sys-

tem. He is looking for other programs that can be converted to the Mac and for new applications he can develop that capitalize on the Mac's strengths. Evslin the skeptic has become Evslin the believer.

More interesting, perhaps, is what Apple thinks of Evslin. I asked Guy Kawasaki of Apple Computer what he thought of Evslin's program and skill. Of the program, Kawasaki said he was using Straight Talk several times a day.

Of Evslin, his praise was effusive. "He's like a free agent who walks on to the practice field and becomes a starter for the Dallas Cowboys," said Kawasaki. Guy Kawasaki is a legend in his own right, and his praise of Evslin is the admiration one genius has for the work of another. ■

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## **MacBugs: Up Close and Personal**

To understand the complexities of some of the bugs Evslin encountered, a little background is necessary.

Evslin says that developing software on the Mac is much like developing software on a mainframe computer. Like a mainframe, the Mac has a toolbox of subroutines and utilities for program developers. Some of the subroutines contain the Mac's user interface and QuickDraw graphics routines; others handle housekeeping tasks such as memory management. For example, you don't set aside memory on the Mac. When you need memory, you call a subroutine (the memory manager) that gets what you need and releases the memory when you're done with it.

The Mac has many such subroutines nested deep inside it. Much as you peel away layers of an onion, so the Mac system peels away, layer after layer, and it seems that there is no core. This kind of sophistication sometimes makes finding bugs more difficult because there are so many subroutines. Each subroutine may actually end up calling several subroutines as the Mac housekeeping programs go about their work.

### **Some Examples**

One of the bugs Evslin discovered was tied to the way the Mac insulates the user from the technical business of files, file types and file

extensions. A lot of effort at Apple was put into making the Mac an easy-to-use machine. Unlike most computer systems, the Mac doesn't want you to type the name of the file you want. The Mac uses a window to display the files used by your program, and you're asked to select the one you want with the mouse. For example, if you're using Multiplan, only Multiplan files will appear in the window for you to select.

The Mac does this by defining a new file attribute, called a signature. A Multiplan SYLK file is a text file with a Multiplan signature. The Mac encourages this protocol with a subroutine called SFGetfile. SFGetfile gets the type of file (i.e., its signature) from the user and then searches the disk for the eligible files. Those are the files whose names appear in the window. You're insulated from having to know about file extensions and attributes; the Mac takes care of all this for you.

One of the things Evslin wanted to do, which the Mac developers had provided for, was to write his own subroutine to look at the files selected by SFGetfile and further narrow the types of files that would appear in the window. The Mac system allowed for this type of subroutine, but when Evslin used it, the system crashed and the little bomb used by Apple to denote a system crash appeared on the screen.

As it turned out, the Mac devel-

opers hadn't anticipated their routine being used in quite the way Evslin decided to use it, so things didn't work as expected. The bug was new to Apple but was quickly solved.

### **More Bugs**

Bugs also turned up in the asynchronous support in the Mac ROM. These bugs affect the Mac's handling of the XON/XOFF protocols, so vital to communications. In the Mac, these bugs were even more significant because the computer uses a queue method to handle commands sent to the system.

If you give several commands in quick succession, the computer spends time executing those commands while ignoring the communications buffer. The buffer fills and the system then loses the data that spills over the top of the buffer because there's no way to turn off the flow of data. This gave Evslin problems until he received a RAM-based version of the asynchronous control program from Apple that fixed the bug. That RAM-based version of the program is what is used in the Link.

The Lisa/Mac development software also has its price in bugs. One of the programs on the Lisa, the resource compiler, has an interesting habit of randomly dropping characters from the files it's compiling. The pull-down menus and screen placement of information is all



File Edit Business Quotes Financial General And More

Change Dow Jones

1st Phone #	2d Phone #	3d Phone #	Access Number
2294966			9

<input checked="" type="radio"/> Telenet	<input checked="" type="radio"/> Telenet	<input checked="" type="radio"/> Telenet	Phone Type
<input type="radio"/> Tymnet	<input type="radio"/> Tymnet	<input type="radio"/> Tymnet	<input checked="" type="radio"/> Touchtone
<input type="radio"/> Uninet	<input type="radio"/> Uninet	<input type="radio"/> Uninet	<input type="radio"/> Rotary
<input type="radio"/> Datapac	<input type="radio"/> Datapac	<input type="radio"/> Datapac	Modem Type
<input type="radio"/> Manual	<input type="radio"/> Manual	<input type="radio"/> Manual	<input type="radio"/> Apple
			<input checked="" type="radio"/> Hayes Smartmodem
			<input type="radio"/> Novation Smartcat
			<input type="radio"/> Keyboard Dial
			<input type="radio"/> Telephone Dial

Password	Speed
( stored )	<input type="radio"/> 300 Baud
	<input checked="" type="radio"/> 1200 Baud

OK CANCEL HELP??

Fig. 2. A sample of Straight Talk dialogue box.

coded in text files that are compiled by the resource compiler. Evslin noticed he was losing characters from his menus and screen text after some compiles.

A call to Apple revealed a bug in the resource compiler for which there's no fix. But recompiling the same file usually solves the problem. That bug is one of the more difficult to deal with because it's inconsistent.

A confusing, but not critical, bug also results in some strange screen handling by the Mac Scrapbook. If you enter the Scrapbook with a program open, as you can from the Link, and the program happens to use a resource type (one of the screens compiled by the resource compiler from the preceding paragraph) that looks familiar to the Scrapbook, then you can end up with a page from your program appearing to be in your Scrapbook even though it isn't really there. This is confusing because it appears you have something in your Notebook when, in fact, you don't. This problem occurs only when the screen in the open program looks like it belongs to the Notebook, and no damage is done, but it certainly is confusing.

### Trial and Error Debugging

A kind of trial and error process developed. When a bug was found, a call would go out to Apple to find

out if it knew about the bug and what the fix was. If Apple didn't know about the bug, then a few days would pass before a fix was worked out. During this initial development phase on the Mac, the people at Apple were swamped with telephone calls because all the developers using the Mac were going through the same thing.

Response time during this shaking-out period was abysmal. To weed out the serious developers from the cranks, Apple initiated a \$500 fee for developers that included unlimited technical assistance. This fee seemed to ease the burden for Apple, and soon Evslin was getting same-day response to his questions. Evslin has been pleased with the response of the people at Apple since they realized his efforts were serious. Things have calmed down a little from the first frantic weeks after the machine's release.

### Results

What's Apple doing about it? First, let's put things in perspective. If it sound like Mac has a lot of bug problems, it doesn't. There are some bugs, but most are technical, the kind that people like Evslin find and mere mortals (Mac users) never see. True, they cause development problems, but developers also find ways around those problems.

Don't forget that IBM released (and still hasn't completely fixed)

buggy software and hardware with the PC. Evslin's evaluation is that the Mac has "fewer bugs per byte" than most mainframe software with which he has worked. Evslin also points out that the Mac development system is better compared to a mainframe development system than to other micros because no one else has anything like this system, with its toolbox of powerful development software. Evslin is probably a good judge since he has worked with many systems, large and small.

In the meantime, Apple isn't ignoring the problem. While no wide-scale ROM replacements seem to be in the wind yet, Apple is working on a memory upgrade for the Mac. Since you'll have to open the box to do the upgrade anyway, it might not be a bad time to fix the ROM problems, too. One thing is certain. Apple is tying much of its hopes for the future to the Mac's success and will almost certainly make sure that changes that need to be made are made.

Software is what is selling most of the IBM PCs these days, software and the IBM name. If the future of the Mac, like the IBM before it, is in the hands of those who write software for it, and if the people writing for the Mac are like Evslin, then the Mac will become another standard.

S.B.



# All You Can Write for \$25

By Eric Grevstad  
Senior Writer

## A Word from the Wizard

*Besides being a Basic wizard, Bruce Tonkin is an avid software salesman; while I was reviewing My Word, he called to point out that the program also runs on the Tandy 2000 (if you use PRN: instead of LPT1:) and foreign-language versions would be easy to produce. I kept him on the phone to talk about My Word, The Creator and his crusade for cheap copyable software.*

**MC:** You printed The Creator's source code in 80 Micro's January 1983 issue. How long had you been trying to sell it before then?

**BT:** 1980 is when I started selling it through the ordinary distribution-type channel [at \$295]; I had at that time two partners, two liabilities, and we were just trying to do things in the traditional kind of way. It didn't work out. We sold about 300 [copies] that I know of. That first company broke up about March of 1981, and I've been a full-time independent since then.

I was figuring that the program was just not going to go; maybe I had misjudged the market and it wasn't as good as I thought. And I said, for whatever reason, if nothing else, how can I go about giving it away? And when I put it in 80, selling it for \$10 if people didn't want to type in the source code, I made over ten times what I made from regular sales. I've sold about 7500 copies of various programs since the time of the first article.

**MC:** With My Word, you're taking on possibly the most pirated program around—WordStar. Do people copy WordStar just because of the price?

**BT:** I've talked to user's groups, and WordStar is pirated to an extent that even I didn't believe possible. For every [licensed] copy of WordStar, there are at least five [pirated ones].

There's a certain self-justification [in piracy], I think. People are rationalizing creatures, and if you got a copy of WordStar and paid full boat for it and full boat for Mail Merge and SpellStar

and all that, you'd end up spending very close to \$1000. Once you've got that and paid for it, yeah, it's decent software, but it leaves a bad taste in your mouth.

I thought [WordStar] was good or I wouldn't have bought it; I've used it for two years, but I didn't think the company was entitled to that much money for the support that it gave and in return for the quality of the product. And what's the programmer at the bottom getting out of WordStar? He wrote it for the company, he's getting a salary, but how much is he really worth? I mean, MicroPro would be nowhere without WordStar; that's 70 or 80 percent of its revenue.

Once people have paid that kind of money, why they pirate is just because of the licensing agreement and the price. I can think of infinite examples. Somebody who's got two or three different machines for business buys a copy of WordStar for one of the machines. The documentation says you can't run it on the other machines; you've got to buy a copy for each one. How many people do that? Almost nobody.

It's very easy to justify in your own mind, [to say] these guys are ripping us off at that price. At \$100 apiece, it's an excellent program; at \$1000, it's not. But then, if you've got a copy of My Word for 25 bucks, you're going to find it very hard to rationalize ripping off a copy and sending it along.

**MC:** Is there any justification for copy protection?



I'd like this to be a coherent, objective review instead of a delirious rave, but I'm not sure I can do it. My Word is the best word processing value yet; except for the integrated package Ovation, it's the most extraordinary piece of software I've seen. I've found several annoyances and flaws, but I'm still going to write an ecstatic review.

### Great Bargain

Why? Because My Word does almost everything WordStar does, with the same commands and mnemonics; in some ways, it's better than WordStar (it's much faster and generates real ASCII files); and it's in Basic and costs one-sixteenth as much. With sort and mail merge features and a pretty good manual, My Word is yours for \$25—unprotected and ready to use as soon as you put backup copies on your system disks. For another \$25, you can have the source code.

More than a program, My Word is a political statement: Author Bruce Tonkin feels that commercial software is grossly overpriced, while software buyers are basically honest—that people don't want to be pirates but are driven to copy programs they can't afford.

Tonkin made his reputation with The Creator, a Basic database program generator; unsatisfied with selling it for \$295 through normal channels, he printed the TRS-80 source code in 80 Micro and set up TNT Software to sell CP/M and IBM versions for \$16 (the manual's an extra \$11).

Since then, Tonkin's upgraded The Creator (there's already a Macintosh version) and added other programs and utilities to the TNT catalog. One is PBasic—a \$39.95 preprocessor, allowing such things as subroutine and function libraries for those who'd like to write structured Microsoft Basic programs.

The preprocessor, according to Tonkin's introduction to the My

Word manual, let him "cheat a little" in meeting the challenge of writing a WordStar workalike without so much as a single machine-language subroutine, but you don't need it to take him up on his source code offer; he supplies both PBasic and MBasic code for the additional \$25.

### .Exe Is the Word

I'd like to see the source code, if only to try and change the preset tabs (every four spaces), but the barebones \$25 package is more than adequate. The word processor is MW.EXE, opened by typing MW from DOS; a 55KB program, it loads in about nine seconds. As in WordStar, the first screen presents a directory of the drive in use. Typing a filename opens that file or opens a new one if the name doesn't exist.

Rather than swapping program overlays and chunks of text from disk, My Word and the current document (up to 50,000 characters) reside entirely in RAM. This means that My

**BT:** The only thing that I could think of that might be a justification for protected software is if there were a product that somebody had put a good number of man-years into, say some super-duper integrated package that did everything, that was really terrific, that had to be sold legitimately for \$1000. At that point I think, yeah, maybe copy protection is necessary.

But for the typical product that's being sold now, I don't know of a single one. Granted, I haven't seen them all, but I don't know one that's really worth much over \$200. I don't think there are any products now being sold that should be copy protected. Especially not word processors; I mean, really, next to languages, that's the worst product that could be protected.

Copy protection started with games, and I think now it's like a cancer in the software industry. And I think as much as my Creator shocked everybody in terms of price, and in terms of performance for what you got, I think the same thing might be true of My Word in terms of copy protection. Another little crusade.

**MC:** There's been a lot of talk lately about the Lotus syndrome, about how it takes millions of dollars in advertising to sell software today. How can you compete with the big companies in terms of marketing?

**BT:** Basically, what I'm hoping to do is not have to run a lot of ads. I think ads are nice and necessary, but it's almost putting the cart before the horse. People will write articles for some of the

mass-circulation magazines saying how you have to have a million dollars to launch a software product, and I think that's really a lot of nonsense, that's just not the way it ought to be. You send the copies out for review and then look around for venture capital. If the reviewers like it, you can go to the venture capitalists, [get money for] a couple of ads and see how it flies.

If [My Word] does take off, I think I won't have to worry about what the price of ads will be, because sales [will be] high enough. You do get a lot of people who are just unwilling to buy a product at such a low price; what I'll probably do is advertise that you can get the whole thing with source code for \$50 and put underneath that you can get it [alone] for \$25.

**MC:** It's an incremental approach; it's not a big splash.

**BT:** Yeah. I would say 99 percent of all software is sold with the idea that the author or publisher is going to become rich overnight. Everybody always thinks, gee, a single program for \$300 each, all I have to do is sell 33,000 to get a million gross, and how many copies before everybody gets a million gross, and you have these pipe dreams about trying to hit it big and be the software equivalent of Mick Jagger.

I'd rather look at the market as a whole and say, IBM is planning to sell several million machines; Tandy, Compaq, Eagle—that's a lot of potential customers out there. You can either get a very large return from a very small market



Word prefers 128KB to 64KB machines and takes longer to open a file than WordStar, but makes things much faster once you've started.

For instance, WordStar's famous help menus offer different levels of aid and different amounts of time waiting for the disk, while My Word's single but complete help screen is available at the touch of the F1 key.

I won't describe My Word's editing commands in detail, because they're instantly familiar to any WordStar user—the magic diamond of the control key plus S, D, E and X for cursor movement, ^Y (Control-Y) to delete a line, ^Kb and ^Kk to mark the beginning and end of a block, and so on. Many commands offer both My Word and WordStar syntax; for example, both Control-home and ^Qr move to the top of the file.

WordStar veterans will also feel comfortable with My Word's dot commands, instructions typed at the left margin such as .pa (to force a page break) or .sp 2 (for double-spaced printing, though My Word can't double space or justify text on screen).

### My Word vs MicroPro's

There are a few differences, some in My Word's favor and some in WordStar's. Besides the F1 help screen, My Word's escape key brings a line of information at the bottom of the display, showing the filename, margin setting and cursor position (in terms of line, column and page number, adjusted for single or double spacing). You must press ESC again to update it, but it's a handy refer-

## Challenge an unsuspecting WordStar owner to drag race...

### My Word kicks WordStar's butt in speed tests.

ence. There are no function keys to mark blocks, but the F3 key is a one-touch equivalent to ^Ks (save and continue), encouraging frequent saves.

However, I miss WordStar's ^Qq (repeat next command) instruction; when you change the margin or insert or delete material, you must reformat every paragraph individually (^B).

There are two features designed for those who write program listings with My Word. One, the ability to do a special save (Alt-F3) that strips away screen formatting's soft carriage returns, leaving long lines except where you pressed the return key, is handy.

But I'm not crazy about the other—if there's any text ahead of the cursor, it takes two returns instead of one to move to the next line. Pressing the return key just once moves the text ahead down a line, but doesn't lower the cursor. It's a nice way to clear a line when inserting a few words, but slows you down if you're inserting more than that.

Tonkin has also changed a few

WordStar commands. It makes sense that, when you search for a particular string (^Qf), My Word puts the cursor at the beginning of the located text instead of the end. However, the delete word function (^T) doesn't delete the space after the deleted word, as Tonkin figures you're more likely to type a replacement than cut the word altogether. Since I more often do the latter, I don't like having to type ^T twice.

### Blinding Speed, Skillful Sorts

Still, these problems fade the first time you challenge an unsuspecting WordStar owner to drag race. Since it keeps the current file in RAM, My Word kicks WordStar's butt in speed tests; when I moved from the bottom to the top of a long (7900 words) document, My Word displayed the first screen instantly and the cursor within two seconds. WordStar took 40 seconds.

From the top, a search for a particular word at the bottom of 26 double-spaced pages took My Word 1.9 seconds to WordStar's 36.4. And a search and replace, changing every e in the document to a number sign (#), required just 33.9 seconds.

The same job took WordStar almost three minutes (2:55)—and that was with the trick, discovered in MicroPro's manual, of hitting a nonprinting key to disable the video display. A regular search and replace, with WordStar showing the changes while scrolling through the file, was only two-fifths done when I had to abandon it; my stopwatch resets after 20 minutes.

penetration and spend all kinds of money getting that small penetration, or you can get your name out, have people know you've got good software, advertise enough to keep your name out in front and sell your software with the idea of making a dollar or two off each [copy].

I think I'll probably end up with a profit of about \$5 or less per copy [of My Word] after office costs and so forth, but I will make a profit. I want to get all of those poor little programmers [out there] out of what I feel is chattel slavery.

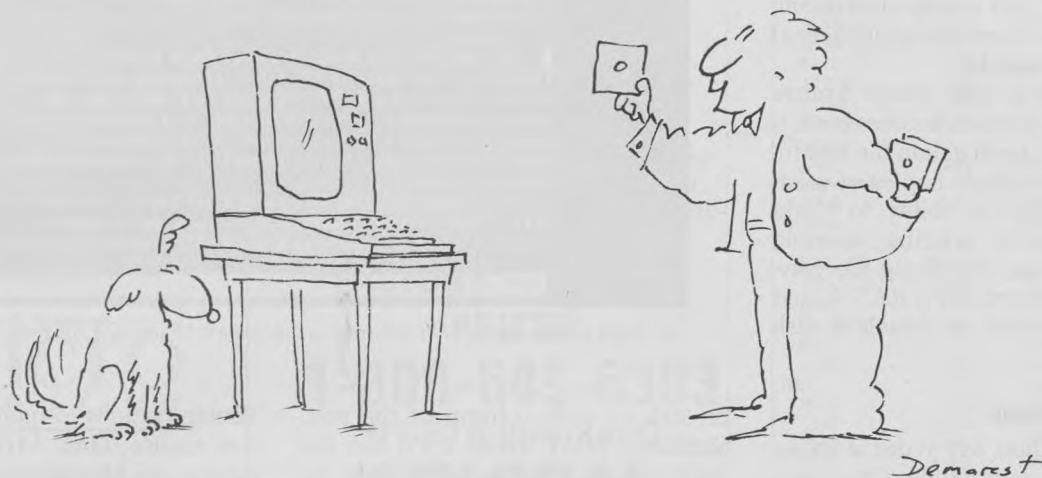
I know there are better programs [than mine] out there, and there are a lot of people who are just as good, but I'd like to be remembered. I think of the software industry like the record industry when rock 'n' roll was just starting, and I would like to have someone look back 20 or 30

years from now and think of me in the same terms as—not Buddy Holly, that's going too far, but maybe somebody like Gene Vincent or Gene Chandler: "Yeah, he had good stuff, had a couple of really nice programs. Whatever happened to him?" Rather than, "Oh, yeah, he made a million dollars."□

(At presstime, Tonkin told Microcomputing that, since everything "just barely fit on a single-sided, single-density disk"—the easiest kind to mass produce—he'd decided to include the IBM-specific My Word and the word count and WordStar file utilities in the base \$25 package. An extra \$10 will bring MWX, a version with about 600 bytes less file space, a built-in 16-level Reverse Polish Notation calculator and the ability to mathematically sum any row or column).



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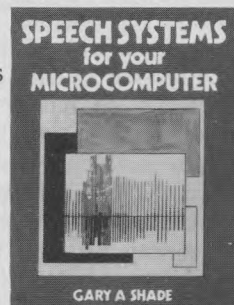
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In addition to being five to 80 times faster, My Word offers some tricks WordStar doesn't. Once you've marked a column of names or numbers as a block, Alt-A sorts the entries in ascending and Alt-D in descending order (according to ASCII values, with uppercase coming before lowercase). I typed 100 words at random; My Word put them into alphabetical order in 5.9 seconds.

There's also a mail merge feature for all but the heaviest business use; it can read items from a data file and insert them in multiple copies of a letter. Along with the ability to chain different files for printing, opening and closing data files along the way, it shows My Word, for a RAM-based word processor, is no slouch at disk file handling.

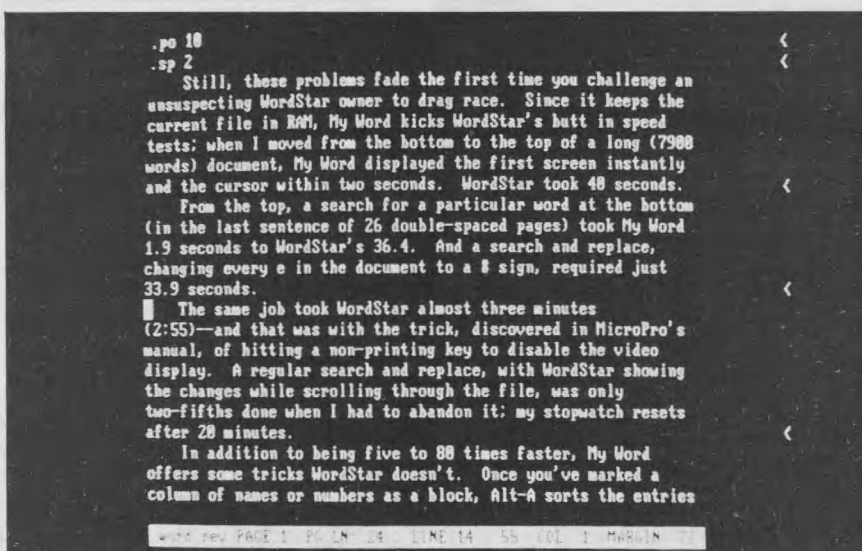
### Printing Problems

On screen, then, My Word is an entirely worthy competitor. On paper, alas, it can't match WordStar's fancy formatting—and I'm not just talking about its failure to support italics, though you can use boldface, double-strike, underlining and an alternate character set.

My Word doesn't care which, if any, disk you have in the current drive, and Tonkin supplies an ingenious trick for printing short, single-spaced documents without any disk at all: Pressing F5 lets you rename the current file, so name it LPT1: and press the F3 (save) key. This results in an unformatted, whole-file screen dump. Pressing F3 several times even lets you print multiple copies.

For serious printing, though, you'll have to leave My Word for DOS and run MWP.EXE, the auxiliary printing program (also in Basic and also included in the optional source code files). This program offers a choice of output devices, such as the RS-232C port or a disk file; it's chock full of easy prompts and menus, perhaps because it's barely mentioned in the otherwise fine documentation.

And it's deceitful. Whether I entered 40 or 60 or 90 columns when MWP asked me to specify a printed line length, I always got 72, the margin value of the MW file. The only visible effect involved the optional page number that was centered, for whatever value I chose, beneath the 20th



My Word screen display. The information bar shown by pressing the escape key is at bottom.

or 30th or 45th column of the text. Similarly, MWP asked if I'd like the right margin justified and then ignored my affirmative answer.

To make MWP perform properly, you must accommodate yourself to its wishes. The trick is to set your file to the desired line length while in MW (as in WordStar, the command to set the margin is ^Or), reformat it one paragraph at a time if necessary, perhaps add the .po (page offset) dot command to keep things centered, and then save it and go to DOS and MWP. Then, if you answer MWP's margin query with the file's own value, everything—even justification—works perfectly. MWP's other options, such as multiple copies or pausing for single-sheet printers, give no trouble.

My Word may not pay proper attention to line length (or remember it, either; if you save a 60-column file and open it later, any lines you insert will be 72 columns until you reset the margin), but, except for that, its value far outweighs its flaws. If My Word and WordStar competed in a decathlon, the former would sprint to victory in a few events, be trounced in another (print formatting) and finish a respectable second in the rest. Considering the price differential, that's amazing.

### Extra Bonus Programs

Finally, there are four other programs on my review disk that I hope

Tonkin decides to include in production copies. One, MWPC.EXE, is a version of My Word that bypasses DOS to address the IBM PC's monochrome video directly, making things like single-line scrolling much faster; Tonkin doesn't want to get trapped into writing specific versions for 20 machines, but it'd be nice to have MWPC there for those who want it.

The three other programs are machine language utilities, about 1500 bytes apiece, executed from DOS. One provides a simple word count of a disk file, and the other two remove and add, respectively, the odd parity bit that makes WordStar files incompatible with ASCII. Both word counts and WordStar compatibility are valuable; I'd say the three utilities would certainly be worth the extra \$10 Tonkin was considering at presstime.

Even if he includes the utilities and the price goes to \$35, My Word is simply too good a bargain to pass up. For years, people have pirated programs they want but are unwilling to pay for; now, programmers with no interest in word processing will buy My Word just to see the source code.■

**System Requirements:** IBM PC or compatible; 128KB RAM; one disk drive.

**Manufacturer:** TNT Software Inc., 34069 Hainesville Road, Round Lake, IL 60073.

**Price:** \$25 (\$50 with source code).



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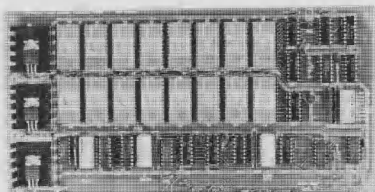
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## 32K S-100 EPROM CARD PRICE CUT!



**\$59.95**

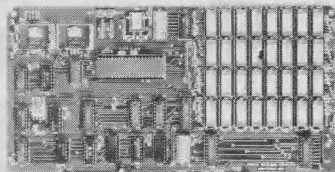
USES 2716's  
Blank PC Board - \$34  
ASSEMBLED & TESTED  
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SPECIAL: 2716 EPROM's (450 NS) Are \$4.95 Ea. With Above Kit.

### KIT FEATURES:

1. Uses +5V only 2716 (2Kx8) EPROM's
2. Allows up to 32K of software on line!
3. IEEE S-100 Compatible.
4. Addressable as two independent 16K blocks
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6. On board wait state circuitry if needed
7. Any or all EPROM locations can be disabled
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BLANK PCB  
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PROGRAM ON DISKETTE)

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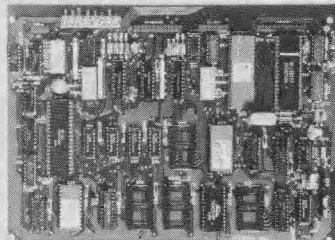
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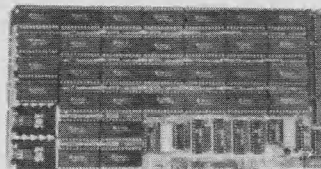
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STANDARD  
(AS PROPOSED)

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### FEATURES:

- \* Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- \* Fully supports IEEE 696 24 BIT Extended Addressing.
- \* 64K draws only approximately 500 MA.
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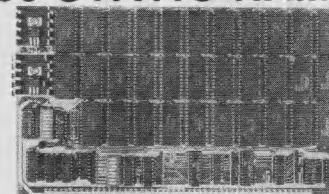
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- \* Fully supports Extended Addressing.
- \* 64K draws only approximately 500 MA.
- \* 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- \* Board is configured as 3-16K blocks and 8-2K blocks (within any 64K block) for maximum flexibility.
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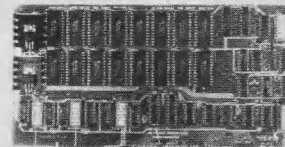
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We took our very popular 32K S100 EPROM Card and added additional logic to create a more versatile EPROM/RAM Board.

### FEATURES:

- \* This one board can be used in any one of four ways:
  - A. As a 32K 2716 EPROM Board
  - B. As a 32K 2732 EPROM Board (Using Every Other Socket)
  - C. As a mixed 32K 2716 EPROM/2K x 8 RAM Board
  - D. As a 32K Static RAM Board
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- \* RAM Kit is very low power (300 MA typical)

## 32K STATIC RAM KIT — \$129.95

For RAM Kit A&T - Add \$40

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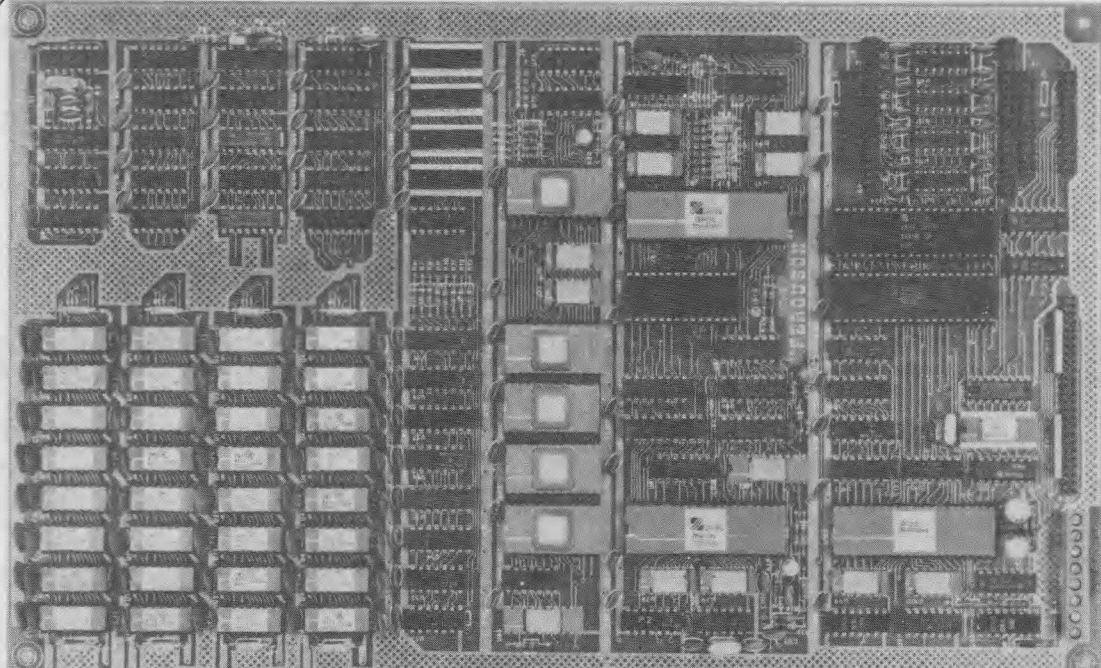
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The Big Board gives you the right mix of most needed computing features all on one board. The Big Board was designed from scratch to run the latest version of CP/M\*. Just imagine all the off-the-shelf software that can be run on the Big Board without any modifications needed.

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The blank Big Board PC Board comes complete with full documentation (including schematics), the character ROM, the PFM 3.3 MONITOR ROM, and a diskette with the source of our BIOS, BOOT, and PFM 3.3 MONITOR.

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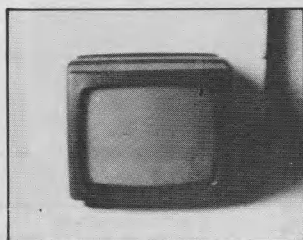
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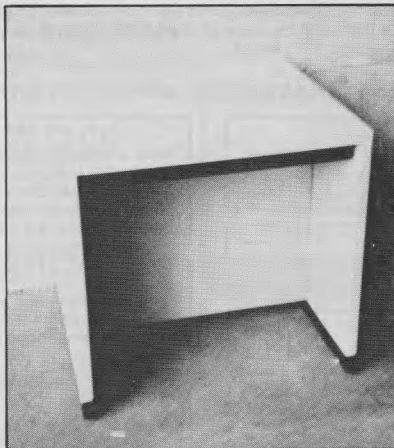


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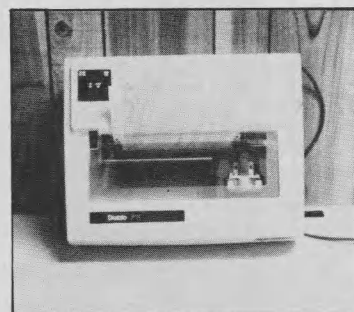
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## Keyprint and Printer Basher

### Keyprint

**System Requirements:** IBM PC or compatible; 64KB RAM; DOS 1.1 or higher; one single-sided disk drive; Epson MX or FX printer.

**Manufacturer:** Softkey Software Products Inc., 2727 Walsh Ave., Santa Clara, CA 95051.

**Price:** \$59.95.

### Printer Basher

**System Requirements:** IBM PC or XT, Compaq or Columbia PC; 64KB RAM for DOS 1.1; 128KB for DOS 2.0 or 2.1; one single-sided disk; Epson MX, FX or RX printer.

**Manufacturer:** Connecticut Software Systems Division, Speer Research Corp., 30 Wilson Ave., Rowayton, CT 06853.

**Price:** \$59.95.

I purchased an Epson printer because of its graphics capability and the variety of typefaces it can produce. The MX family of printers offers pica characters, italics, subscripts, expansion, compression and various combinations of overprinting for darker characters. All these features are permanently stored in the printer's ROM. The FX printers add an Elite font and the special characters unique to the alphabets of eight languages.

However, it took many hours of study to pry all the secrets of fancy printing from the manual. If you feel you need immediate results from your printer investment, a printer utility may be just what you're looking for.

A printer utility program sends control codes to your printer, telling it to change typefaces or spacing. The Epson MX family of printers respond to about 60 of these codes and the FX to considerably more. A control code consists of two characters: the first is a nonprinting character used to get the printer's attention; the second

selects the required font. For example, to turn on italics you just send the printer the escape character followed by the number 4. In Basic you'd have to write `LPRINT CHR$(27);"4"` to get the same results.

Most word processors will take care of this control by using embedded commands. But have you ever developed a spreadsheet only to find that it won't fit on a single page of a report? That's when you need compressed characters. VisiCalc provides the ability to send a printer the necessary code, but it's up to you to discover that the sequence is `^ H0F ^R`. From Lotus 1-2-3 you enter the compressed mode as `\027\015`. There's not much similarity!

Control of an Epson printer gets even messier when you want to combine several printing characteristics together. For instance, you might want to print a title at the top of a report with double-width characters, emphasized for reproduction. To complicate matters further, not all font and spacing combinations work together.

### Take the Simple Approach

Keyprint takes a simple approach to controlling an Epson printer. The disk is placed in drive A and booted. After a copyright notice, the main menu appears (Fig. 1). Font, character width and print intensity are selected with single-digit numbers. You can print a sample of the selection, make changes or set the printer and exit to DOS.

You're protected from making incompatible selections. For example, if you choose emphasized font and compressed character width, Keyprint will respond with a message telling you that this combination isn't available.

There are some limitations. You must remember to set the printer before loading the program you intend to use because there is no way to change fonts while printing.

Keyprint is straightforward and does exactly what it claims. It works equally well with the Epson MX or FX printer, either with or without a buffer. I used it to produce a compressed spreadsheet, and a page of italic text from a word processor. In the latter case the printer had to be undefined. I have just one complaint. When the printer is set, the paper is advanced several lines, making it difficult to align the top of the page.

The disk I reviewed was copy protected, but the people at Soft-Key tell me they're reconsidering this policy, so you'll be able to put it on your hard disk.

### Printer Basher—Sophisticated

Perhaps a psychologist would read some deeper meaning into the name of the next utility, Printer Basher. This program has more options than Keyprint; it's intended for a more sophisticated user. If you own an Epson FX-80 or FX-100, you'll be happy to hear that Printer Basher takes advantage of the extra features in these printers.

The disk is inserted in drive B, which you must select as the default drive. Although this is stated in the accompanying manual, I got myself into difficulty trying to boot after the prompt with `A>B:` `BASHER`, which isn't the same thing. I think most of us expect to start a program in drive A.

Printer Basher leads you through four menu pages to choose the printer type, font, character size and letter spacing. I found it advantageous to run the demonstration program on each printer and



make a reference chart.

This program offers a few more options than Keyprint does for the MX printers, such as the ability to set line spacing, form length, margins and to underline. If you have the need for many different printer setups, provision is made to store these as named files on the Basher disk. To recover a setup, Speer has provided a Basic program to read the stored file, send the settings to the printer and exit to DOS. I don't like the idea of writing definition files to a program disk when it's copy protected; I'm also not happy with the suggestion that if you fill the available space, you can delete unused files.

Printer Basher is most useful if you need the options provided by the Epson FX printers. When you boot an IBM PC in text mode, ASCII characters with values 128-255 are defined as a series of foreign or graphic symbols in memory. These are displayed on-screen by holding down the ALT key and typing the ASCII number on the keypad. The bit definition of these characters is stored in RAM and may be redefined by a program of your own. The IBM *Technical Reference Manual* of January 1983 specifies three additional character sets. All share the usual Qwerty characters, but allocate those above ASCII 128 differently. One defines block graphics, another algebraic and line graphics, the third line graphics and Greek characters.

One of the most common printer problems is that what you see on the screen is not what gets printed. Printer Basher partially solves this dilemma by providing copies of the three extended character sets on its disk, any one of which can be copied or downloaded to the printer's RAM.

Of what practical use are these graphics? Try to use a word processor to draw up a form with solid ruled lines. Most won't print correctly. On the IBM PC screen, ASCII 218 is the top left-hand corner of a box, an inverted L. When sent to the printer it is interpreted as an italic Z.

Stored printer definitions may be

```

                                KEYPRINT
                                PRINT STYLE SELECTION
-----
CURRENT SETTING:  HIGHLIGHTED BELOW

FONT TYPE:
1  NORMAL                      : PICA CHARACTERS
2  ITALICIZED                  : ITALICIZED PICA CHARACTERS
3  EMPHASIZED                  : BLOCK CHARACTERS

CHARACTER WIDTH:
4  NORMAL                      : 10 CHARACTERS/INCH
5  NORMAL COMPRESSED          : 17 CHARACTERS/INCH
6  DOUBLE WIDTH                : 5 CHARACTERS/INCH
7  DOUBLE WIDTH COMPRESSED    : 8.5 CHARACTERS/INCH

DOUBLE STRIKE:
8  OFF                        : SINGLE PRINT STRIKE
9  ON                         : OVERSTRIKE OF CHARACTERS

                                Press ESC for help
SELECT PRINT STYLE NUMBER OR <RETURN> TO SET UP PRINTER:

```

Fig. 1. Keyprint's main menu.

called from a Basic program. Indeed, Printer Basher will be of use to Basic programmers as well as the layman. However, I do wish this program had included an exact copy of the standard character set that appears on the IBM screen for ASCII characters 128-255.

### Quirks

Both Keyprint and Printer Basher share an idiosyncrasy: neither program will run unless the width is set to 80 columns. Perhaps few people have the internal switch settings of their IBM PC set to boot up in 40 character mode, but I do.

I checked both these programs on an IBM PC and a Columbia computer, with and without printer buffers, with output to MX-100 and FX-100 printers and I encountered no problem. If you need a really simple utility, Keyprint is your choice. Those of you who can write Basic programs will probably prefer to write your own. Users of an FX printer should consider Printer Basher, particularly if you plan to use nonstandard characters.

**Martin Oakes**  
Freeport, IL

## AppleWorks—One Neat Package

**System Requirements:** Apple IIc or IIe with 80-column card; 64KB; one disk drive; a printer, second disk drive and extended text card for the IIe are recommended.

**Manufacturer:** Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014.

**Price:** \$250.

A word processing program from this software company, a spreadsheet from that, a database manager from another... you know the problems. You have to wrestle with different commands for each program and with the inability to move information between them. Still, there are



advantages to individual programs, even if the publishers of the new integrated software packages hate to admit it. With individual applications you can choose the program with features that suit your needs—and your pocketbook—and not be troubled with exotic capabilities of no interest to you.

To reemphasize the ability of the 128KB Apple IIe to run a sophisticated integrated program, Apple has given us (well, will sell us for \$250) AppleWorks, which provides word processing, a spreadsheet and database management in one neat package.

#### Apple Presents . . .

AppleWorks comes equipped with two extensive manuals and five floppy disks. Two disks contain the demo and introduction program Apple Presents AppleWorks, two disks provide the start-up and main AppleWorks program and the fifth supplies sample files. There is also an operating commands reference card.

The AppleWorks tutorial provides a cursory look at the entire package and guides you through the program using the sample file disk. The larger text, *AppleWorks Reference Manual*, is a complete operating description. Both manuals are indexed.

The demo disks offer a guided tour of AppleWorks, and the complete reference manual describes the program in detail, providing many tips that should enhance

## To reemphasize the abilities of the 128KB Apple IIe to run sophisticated programs, Apple has given us Appleworks.

your AppleWorks education.

The word processing, database and spreadsheet files are called to the desktop (Apple's memory) and used individually with rapid switching from one to the other. Up to 12 files can be on the desktop simultaneously. The clipboard concept (a 250-line memory area) allows you to cut a portion from a document, save it on the clipboard and paste it into another file. Files created by Apple's QuickFile program can be used by AppleWorks. AppleWriter, DIF and ASCII text files can also be used but must first be converted to run under ProDOS. Files on DOS 3.3 disks cannot be read directly by ProDOS-directed AppleWorks.

Key commands are kept as similar and as simple as possible in all operations. The open apple (or closed apple, although the manuals fail to mention it) and second key provide option choices. File folders graphically display your current depth in the files. (See Fig. 2.) The ESC key will back you out one level at a time or save you from unwanted inputs. Windows can be opened to show options, provide help or switch the current working file without going through the menu selection process.

You can connect up to three printers (two on the IIc) and enter parameters for each. I had no trouble operating both a dot-matrix and daisy-wheel printer that weren't specifically provided for on the printer selection menu. All or part of a file may be printed. Also, as in all modes in all three programs, you can get a screen dump at any time.

Care has been taken to ensure that files can't be accidentally destroyed and error trapping throughout is excellent. Help "pages" are available in all modes. Use of a clock card, such as ThunderClock, is also supported. The disks aren't copy protected.

#### The Word Processor

Text entry is screen-oriented and two cursors are available—one is an overstrike and the other is an insert—either one can be used at any time. Screen, page and document scrolling is fast and easy. The screen's bottom line indicates the current line and column cursor position. Tab stops are set and shown at the top of the screen.

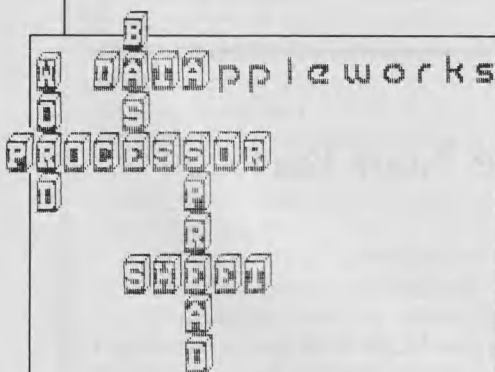
Formatting abilities are extensive. Photo 1 shows the screen with the formatting option-window open. Parameters can easily be changed within a document and saved to disk, and later recalled when you start a similar file.

Unlike many word processors, information on formatting isn't normally displayed in the text, so the text appears on the screen much as it will be printed. There are exceptions, such as double spacing, boldfacing, underlining and a few others. Some users will miss a right-justification display. Simple key sequences show or hide the formatting remarks, which are in plain English instead of obscure symbols—a nice enhancement.

One unique feature that I liked was the keyboard-entry printing pause. If you select the pause, the printer will wait for keyboard input and then resume its printing chore.

Saving and recalling files to disk is swift and sure. Multiple copies or revisions can be saved by changing the working name of the document. One-line headers and footers with embedded page numbers are also possible.

AppleWorks can handle about 26 single-spaced pages in memory. There is no provision to link additional files when printing. Find, replace, move and copy features are easy to use. Pagination, page numbering, marker settings, superscript, subscript, underlining and



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AppleWorks is a trademark of Apple Computer, Inc.



proportional spacing are all available if your printer can handle it. In short, just about everything you would want in a sophisticated word processor is here.

### The Database

If you're familiar with Apple's QuickFile program, you already know how the database portion of AppleWorks functions. QuickFile records can be read directly by AppleWorks.

The entire database file resides in memory. This provides exceptionally fast sorting, searching or format changing but does limit the total document size. About 750 records of 75 characters each is the limit on a 128KB Apple. Maximum record length is 1024 characters and a maximum of 30 categories per record.

The format you select during file creation can later be changed to suit your needs. Records are displayed horizontally across the screen with additional record information off-screen. Move the cursor to the line of the record you wish to view and an open apple/Z key sequence zooms in on the entire record. You may shuffle the categories of your record to display information in any order.

Searching the file or grouping records with similar attributes is especially nice. You may search the entire file for any character or limit the search for specific characters within a given category. Searches and sorting may be conducted based on dates, values (greater than, less than and so on) or characters. Calculation capabilities provide four-function math or numerical columns.

Printing can be done in one of two ways: the entire database, or a portion thereof, can be printed; or labels containing several categories from each record can be printed. You create a format for the appearance of the data and then save it to disk under its own name, so you can have many formats on-hand to fulfill all your printing requirements. This database lends itself well to mailing labels.

The only drawbacks are the limited size of each database and the

restrictions on record sizes. I think this is one of the nicest database programs to learn and use; it's the best on the Apple II. Apple retained all the excellent features of QuickFile and added AppleWorks flexibility to this segment of the program.

### The Spreadsheet

Those of you familiar with VisiCalc-type spreadsheets will have little trouble adapting to AppleWorks. Most of the features found in other advanced spreadsheets are provided. You'll need to go through some relearning to use the input and cursor commands because these are kept standard within AppleWorks and are different from those you find in other programs.

AppleWorks provides 127 columns by 999 rows with a maximum of 6000 filled cells on a 128KB Apple IIe. Standard functions include @ABS, @CHOOSE, @COUNT, @ERROR, @INT, @LOOKUP, @MAX, @MIN, @SQRT and @SUM along with the financial function @NPV. Logical functions using @IF are, of course, provided.

Cell formatting is extensive; widths can be increased to 75 characters and protected in various ways. The screen can be split, allowing important information to remain in view while you work on another portion of the sheet. Copy-

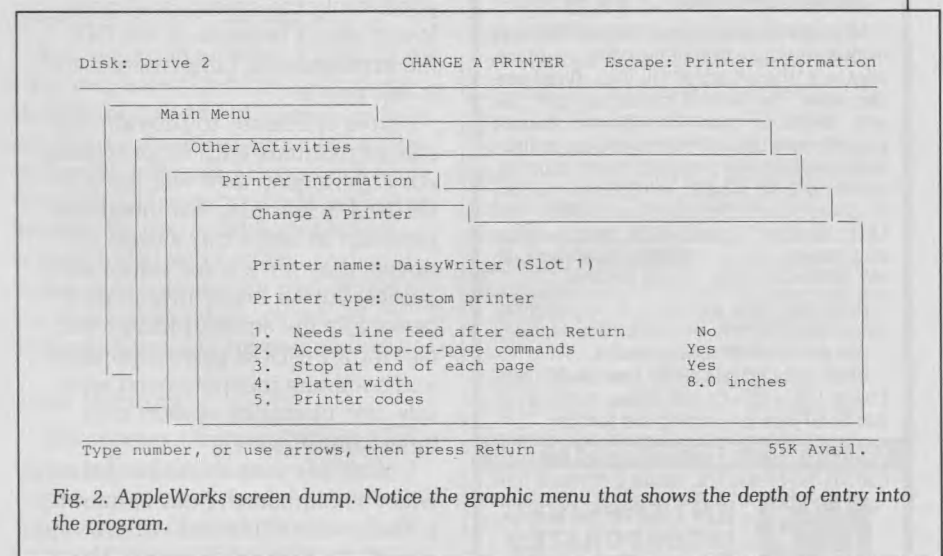
ing or moving columns and rows within the spreadsheet is a snap.

Current calculating methods, such as automatic or manual and column or row precedence, are displayed at the bottom of the scrolling help screen. This position is poor. Status information should be at the top of the help screen or displayed in some more obvious place.

My biggest disappointment concerns the way AppleWorks handles DIF files. Only rows can be saved, not columns. When saved, the entire row across the sheet is marked, even blank cells. When recalled, the row replaces existing rows, which are moved down on the sheet. DIF files cannot be recalled directly into an existing sheet. You must first create a new file using the DIF file, then save it to the clipboard and finally paste it into a working sheet. Cumber-some!

### On the Whole

I haven't described all of AppleWorks' features, but it's safe to say this is a loaded program that should satisfy the needs of most users. Outstanding are the help screens, integrated key sequences, cursor movements, speed and printing abilities. I especially like the screen dump, pause for keyboard and multiple printer capabilities. The database segment is excellent, the word processor very





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MFJ-1242	\$119.95	2	3	MFJ-1246	\$199.95	5	5
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Move or Copy from	To Word Processor	To Database	To Spreadsheet
Word Processor	YES	NO	NO
Database	YES *	YES	NO
Spreadsheet	YES *	NO	Rows only

File: AppleMk. Review PRINTER OPTIONS Escape: Review/Add/Change  
 indicates the current line and column at which the cursor  
 resides within the document. #

AppleWorks can handle about 26 single-spaced pages within its memory. There is no provision to link additional word-processing files when printing. Find, replace, move, and copy features are available and easy to use. There is pagination, subscript, superscript, page numbering and marker settings. In short, just about everything you would want in a sophisticated word processor.\*

Option:	DJ: Unjustified	GB: Group Begin	BT: Boldface End
	CN: Centered	GE: Group End	+B: Superscript Begin
PW: Platen Width	PL: Paper Length	HE: Page Header	+E: Superscript End
LM: Left Margin	TM: Top Margin	FO: Page Footer	-B: Subscript Begin
RM: Right Margin	BM: Bottom Margin	SK: Skip Lines	-E: Subscript End
C1: Chars per Inch	LI: Lines per Inch	PN: Page Number	UB: Underline Begin
P1: Proportional-1	SS: Single Space	PE: Pause Each page	UE: Underline End
P2: Proportional-2	DS: Double Space	PH: Pause Here	PP: Print Page No.
IN: Indent	TS: Triple Space	SM: Set a Marker	EK: Enter Keyboard
JU: Justified	NP: New Page	BB: Boldface Begin	

Unlike The Incredible Jack 2 or 1-2-3, AppleWorks has no graphing



abilities. However, a call to Don Field, Apple's AppleWorks product manager, confirmed the fact that many outside software developers are designing programs to complement AppleWorks. A graphics package will probably be among them. Look for a mail merge addition as well. Sensible Software will shortly have The Sensible Speller performing under ProDOS.

With AppleWorks, Apple has a winning integrated package. It's an easy-to-learn, pleasure-to-use, feature-laden program that will, in the long run, become THE word processor/database/spreadsheet program for Apple II computers.

Arthur Ude  
Stoddard, NH

## ZDS: A Best Buy

**System Requirements:** Z80 CPU running CP/M-80; 32KB; one or two disk drives; terminal with addressable cursor.

**Manufacturer:** ZEE MicroWare, PO Box 8816, Moscow, ID 83843; marketed through Elliam Associates, 24000 Bessemer St., Woodland Hills, CA 91367.

**Price:** \$129.50.

If you're looking for a program development system for a Z80 microcomputer at a reasonable cost, ZDS may be the answer. ZDS is a Z80 assembly language program development system complete with an editor (EZText), a macro assembler (ZMac), a linker (ZLink), a subroutine library manager (ZLib), a subroutine library (ZSublib) containing commonly used subroutines, a translator from 8080 to Z80 assembler (ZTran), and a debugger (EZDT).

ZDS is command-driven and designed for users familiar with CP/M and assembly language programming. The only menus used in ZDS are in the text editor, EZText, where six one-line menus are displayed on the top line of the screen, one at a time. Two programs, ZLink and ZLib, list their options when invoked without any parameters. All other programs use standard CP/M syntax.

### Notables

The editor, EZText, is a full-screen text processing program using primarily single-character commands with prompts for additional information. In the menu mode, cursor positioning, scrolling and single-character commands are ac-

cepted. After a valid command has been entered, EZText switches to function mode and text may be added, changed, moved or deleted.

EZText can process files larger than the available memory using a disk buffering technique. You can put text in columns with user-defined or default tabs. You can also set flags that will be used in commands such as Goto, copy, kill, write or list. Control sequences, except for Control-C, may be inserted in the text.

To configure EZText, you record your terminal function code in a table. The first time EZText is invoked, it will ask you to respond with any changes to its default codes. After your codes have been entered and checked, you're instructed to save the new COM file. Terminal codes for the ADM 3A, ADM 5A, SOROC 120 and the TeleVideo 912/920 terminals are listed in the documentation.

The macro assembler, ZMac, is a two-pass assembler that uses standard Zilog/Mostek mnemonics, producing an object module in either Intel Hex or Microsoft REL formats. ZMac supports in-line or stored macros, conditional assembly, included source files, and external subroutines. It's possible to generate cross-reference tables, symbol tables and op-code tables.

### Most Exciting

The most exciting feature of ZDS is the subroutine library. ZSublib comes with many useful routines, including system interface routines to do standard CP/M calls, a print-

er interface routine, several conversion routines, multiply, divide and compare routines, and several buffered I/O routines.

You can also create your own subroutines and put them in a library using ZLib, the library manager. ZLib can create new subroutine libraries, copying REL files from either another library or individual files. The names of each module in the library as well as information on the modules may be displayed.

After the program is assembled and any new subroutines have been added to the library, you're ready to combine the relocatable object modules (REL files) into an executable load module (COM file) using a linking loader called ZLink. ZLink can save the COM file on disk or load it into memory for immediate execution. The data storage areas will all be initialized to hex zeros so there will be no garbage in the data fields.

When the newly created COM file fails to execute properly, you may debug it using EZDT. This Z80 dynamic debugger is closely patterned after Digital Research's DDT, but with many new useful features. All 12 commands in DDT are supported in EZDT and 12 new commands have been added, including setting permanent breakpoints, calling a subroutine, converting data, hexadecimal arithmetic, quitting and displaying the stack.

Many of the EZDT commands display the contents of the registers at completion and can optionally display secondary registers. Some of the familiar commands have been enhanced with word options or by displaying additional information. The A command assembles standard Zilog mnemonics and the L command disassembles the code.

Beside the main programs, five additional programs are included. XDIR comes as a COM file and will list the directory of a disk displaying the file size in kilobytes and the amount of space used and available on the disk. DumpC, DumpL, DiskDMP and ListF come as Z80, REL and COM files. These



programs dump a file to the console in Hex and ASCII, dump a file to the printer in Hex and ASCII, dump the contents of a disk by sector in Hex and ASCII and list an ASCII file on the printer, respectively. The four Z80 files are well-documented and can be used as examples of Z80 programs.

For an additional \$15, a second disk can be ordered containing the source code for the Z80 subroutines, a replacement for the CCP module of CP/M called UIF6, a detailed, step-by-step procedure to install UIF6 in your system, some macros to use with the macro assembler and some additional macros for you to modify to run with ZMac. The source code for the subroutines can be used both to understand what they do and to show you how to write your own subroutines.

Three new commands have been included with the CCP replacement, UIF6. A Copy command has been added to allow files to be copied without the use of PIP. Instead of having to do a Control-P with Type, the List command will send output to both the console and the printer and will perform a form feed after 58 lines.

The R/O and R/W attributes of a file can be changed with a SetA command. Under UIF6, a Control-B will do a disk reset without executing a warm boot. UIF6 will automatically search other disks if the file is not found on the specified disk. Submit has been modified to permit direct batch mode command entry, to support the Control-C and Control-P functions in a submit file, and to process the Submit file from any disk unit.

### Performance Particulars

The response time of the seven programs of ZDS is acceptable. Performance testing was done using a 638 line, 21KB Z80 file on an Access Matrix computer with dual, single-sided 5¼-inch drives.

Loading the Z80 file with EZText does have a noticeable delay—33 seconds. However, loading the same file under Perfect Writer, which also uses disk buffering techniques, took 56 seconds. Per-

fect Writer was a little faster doing a page forward—three seconds—while EXText took four seconds. Running EZText as if the terminal didn't have the Clear Screen function slowed the performance so much that it became annoying.

Assembling the 638-line Z80 file without saving the listing took one minute, 23 seconds. Linking the same program and searching the subroutine library for six subroutines took 22 seconds.

### Documentation and Support

The documentation of ZDS was run on a dot-matrix printer, photocopied and put in an attractive binder. The manual I've reviewed is only a preliminary product. It's brief, but it contains enough information to be suitable for a user experienced with macro assemblers. An expanded manual will be sent to all registered users of ZDS.

The disk contains some supplementary information on the subroutines in ZSublib and on EZText. However, the subroutine documentation is incomplete. The CP/M I/O routine documentation does not state which CP/M function calls they perform, nor whether registers are saved and restored. Purchasing the source code for the subroutine solves this problem.

The EZText test file is especially useful. It was designed so you can determine if you have configured EXText properly, but it is also a tutorial on using EZText.

The only area of the program that may cause problems concerns trying to figure out how to configure a terminal for EZText. Since ZDS is written by a small company

and marketed by another, support will probably be limited but not inaccessible. I found Zee MicroWare to be friendly and helpful, but I was unable to get EXText configured for the Access Matrix computer. I still don't know if the problem is in EZText or in the Access Matrix computer.

### No More Drudgery

In spite of the problems I had configuring EZText, I'm impressed with ZDS. It's a complete package. The subroutine library makes programming easy and a pleasure by removing the drudgery of coding. The modest price tag and all the extras that come with ZDS make this a best buy.

I was impressed with the operation of the translator, ZTran. I translated four separate programs and didn't find any problems. In fact, the only problem I encountered in ZDS was in the Go command of EZDT. It seemed to get stuck at an address and wouldn't go on. After I changed the program and reassembled, I couldn't duplicate the problem. It appears to be a well-tested product.

My only objection to EZDT was in the Go command. I couldn't specify a temporary break point without telling EZDT where to start running. This turned out to be a bug that will be fixed by the time this review is published.

I plan to continue using ZDS for any Z80 assembly language programming and I recommend that anyone considering a Z80 program development system should investigate ZDS.

**JoAnne Benedict  
Longmont, CO**

```
Menuit: >Fwd, <Bck(Scroll) D=Delete I=Insert nF=Fwd, nB=Bck(nPage) S=Set N=Next
EZTEXT TEST FILE
>>Read each instruction block completely before entering specified input<<

TEST 1, Menu line queue.

The top line on the terminal screen is the menu line and should
presently display menu number 1. Press the N key a number of
times in slow succession and the menu line should cycle through
the six menu lines in a 1,2,3,4,5,6,1,2,3,4,5,6,1... sequence.

TEST 2, Basic cursor movement.

Test the <LFT> or <CTRL-A>, <RHT> or <CTRL-S>, <UP> or <CTRL-W>,
and <DWN> or <CTRL-Z> cursor movement keys (arrow keys) including
the optional preceding numeric repeat factor.

TEST 3, Paging.

Move the cursor to the left end of this line and then slowly enter
P P B B and the display should page forward 2 pages and then back 2
```

Fig. 3. ZDS's text editor—EZText.



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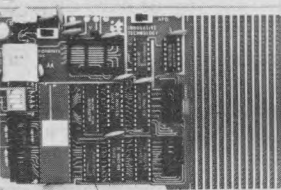
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The APB is an excellent educational aid which allows for evaluation and familiarization of 6801 family members. It is great for prototype development. Since the nuts and bolts are already in place, the designer need only add the necessary interface circuits for a particular application. It can also be used as a simple cost-effective dedicated controller for those limited quantity applications.

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# NEW PRODUCTS

Edited by Amy Campbell

*The AT&T PC 6300 comes with two half-height 360KB floppy disk drives and 128KB RAM or with one drive and a 10MB hard disk and 256KB RAM.*



## AT&T's PC Hits the Market

The communications megacorporation, AT&T, has entered the personal computer ring with an IBM-compatible MS DOS machine. Whether or not the new computer will be AT&T's trump card in top-ping computer industry leader IBM remains to be seen. The Intel 8086-based personal computer runs at 8 MHz (running applications 50-80 percent faster than the IBM PC), has better graphics (640x400 pixels on high-resolution monitors) and more expansion slots.

The PC 6300 sells for \$2810 in its dual floppy drive, 128KB RAM configu-

ration with DOS. As well as being a stand-alone machine, the PC 6300 can operate in an integrated computing environment with AT&T's Unix system-based 3B computers through its software product PC Interface (\$100). The program lets the PC 6300 act as one of up to 18 workstations in a network with the 32-bit super minicomputers.

The machine includes a clock/calendar with battery backup, nonglare screen and a tilt/pan monitor. The adjustable keyboard sets to three positions. It has seven usable expansion slots (six slots with hard disk configuration) and a 16/eight-bit data bus converter. Memory is expandable to 640KB

RAM on either dual floppy or hard disk configurations. Input/output ports include an RS-232C, Centronics parallel and video display.

The hard disk version with 256KB RAM sells for \$4985 with DOS. For more information, contact AT&T Information Systems, 100 Southgate Pkwy., Morristown, NJ 07960. Reader Service number 400.

## All Keyed Up

If your fingers spend most of their keyboard hours hovering around the numeric keypad, then the Touchstone 1 Rapid Data Controller (\$169) may be for you. The dedicated, plug-compatible 29-key numeric keypad for the IBM PC and XT offers a lot more than numbers. It includes dedicated cursor controls and space, backspace, home and enter keys, plus a full set of math keys, including percent and brackets for compound math formulas.

Developed as a productivity tool for spreadsheet, accounting and similar number-intensive applications, the Touchstone 1 isolates the number keys in an adding machine layout, with the arithmetic and control keys just an inch away. The pad measures eight inches square and plugs directly into both the keyboard out-

let at the rear of the PC cabinet and into the keyboard connector so you can use both keyboards at all times.

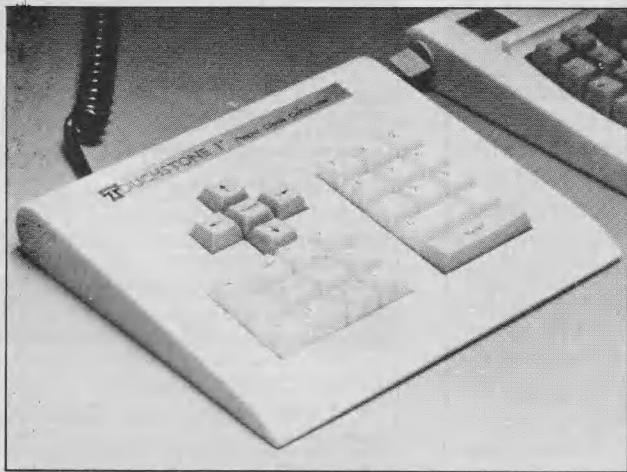
An on-board microprocessor scans the keyboard matrix and ensures that rapid entries register accurately. The keys are full-travel, low-profile, and include a PIP on the 5 key. The Touchstone 1 is available from Touchstone Technology Inc., 995 Buffalo Road, Rochester, NY 14624. Reader Service number 404.

## Macintosh Shows Off

When is a Macintosh not a Macintosh? When it turns into CineMac, a version of the Macintosh with an added video port that lets you send the screen image to an additional monitor. Imagine the applications for demonstrations and teaching. The picture will have the same quality and high resolution as the regular Macintosh screen, only larger.

You can use any video monitor with a horizontal scan rate of 22 kHz or more. A compatible monitor is available with CineMac at an additional charge.

The external monitor connects to CineMac through a video plug installed in the back of the Macintosh. All portions of the CineMac are



*If numbers are your game, this dedicated numeric keypad, the Touchstone 1 Rapid Data Controller, may make your data entry easier.*



## NEW PRODUCTS

located inside the Macintosh case.

CineMac is available as part of a Macintosh system (CineMac, Macintosh, Imagewriter and Accessory Kit) for \$3255, or as an upgrade kit for \$195. The kit is available through and must be installed by an Apple Dealer/Service Center.

For information and a list of compatible monitors, write MicroGraphic Images Corp., New Products Division, 19612 Kingsbury St., Chatsworth, CA 91311. Reader Service number 403.

### Junior Gets Two Drives...

Yes folks, it's hard to believe, but little Junior is growing up. Why, already he's getting his second drive!

Legacy Technology is shipping a two-drive controller for the IBM PCjr. The floppy disk controller provides access to two disks through Junior's operating system.

The cabling powers one disk drive inside the Junior and extends under the cover to control the second drive. For more information, contact Legacy Technologies Ltd., 4817 North 56th St., Lincoln, NE 68504. Reader Service number 408.

### IBM PCjr Add-Ons

Two peripherals have been announced for the IBM PCjr—a 256KB memory board with clock calendar and battery backup, and an expansion box that lets you use IBM PC boards in the PCjr.

The expansion box comes complete with three options slots to accommodate cards for the IBM PC and an interface for standard PCjr boards. For more information on either product, contact Computer Products International Inc., 2025

Gateway Place, Suite 124, San Jose, CA 95110. Reader Service number 411.

### Portable Micro Cassette Drive

The Bullet from Holmes Engineering is a fast mass storage system for various notebook computers, such as the TRS-80 Model 100, The Olivetti M-10 and the NEC 8201. The Bullet plugs into the RS-232C port and uses menu commands from the computer.

Its rechargeable battery can power both the drive and the computer (it comes with a transformer) and fits inside a briefcase along with your lap computer. The Bullet uses wafer tape cassettes to store up to 64KB of memory per tape. It is 50 percent faster than the PMD-100 (an older sister product from Holmes) and can save and verify a 10KB file in about 40 seconds. The Bullet comes with connecting cables, wafer tape, manual and charger for \$369.95 from Holmes Engineering, 5175 Greenpine Drive, Murray, UT 84123. Reader Service number 406.

### Cool Computing

PCool (\$99.95) is an auxiliary cooling system dedicated to keeping the IBM PC or PC XT cool when you use expansion cards or a hard disk drive. The manufacturer claims PCool drops the temperature an average of 15 degrees by providing an intake airflow directly across the expansion cards. It helps eliminate hot spots and buildup of thermal bubbles.

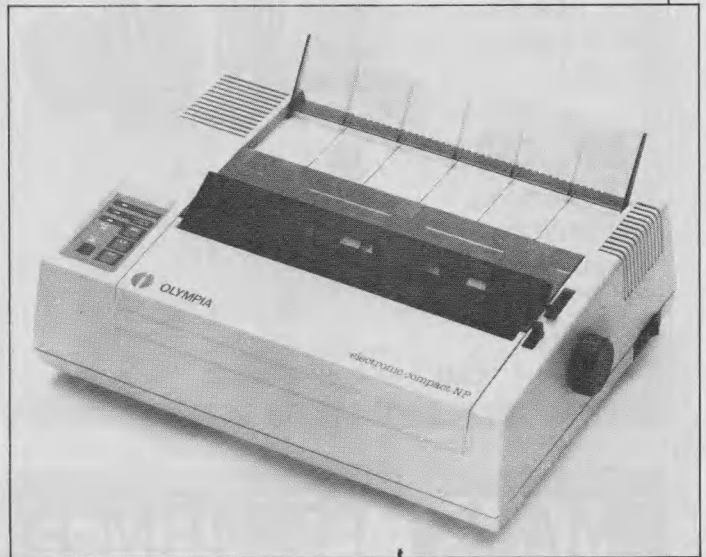
You can install the internal fan unit in five minutes without any modifications. To order, contact Analytic Information Processing, PO Box 966, Danville, CA 94526. Reader Service number 409.

### Dot Matrix At \$499

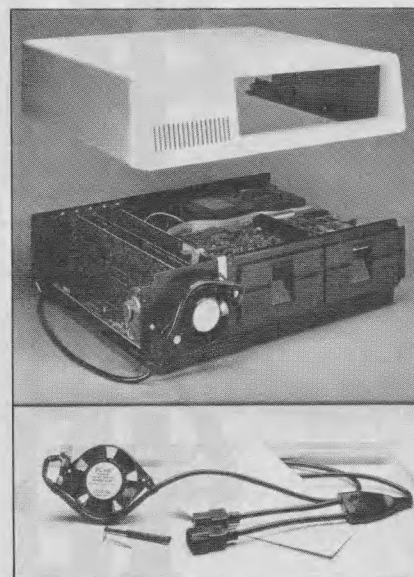
The Olympia Electronic Compact NP is a low-cost dot-matrix printer. It prints at 165 cps in draft mode and 82 cps in correspondence mode. It comes with a parallel Centronics-compatible interface, and an RS-232C interface is optional.

In text mode, the printer offers bidirectional shortest-path-seeking logic printing. In bit-image mode, it prints unidirectionally. The nine-pin print head produces 96 ASCII characters with descenders and seven international character sets. Its buffer handles 2000 characters.

The 4.7 × 11.8 × 15.9-inch unit (\$499) accommodates continuous paper up to ten



Compact and quiet, this Olympia dot-matrix printer can be yours for \$499.



If you've added boards or a hard drive to your IBM PC, this cooling system can keep things from overheating.





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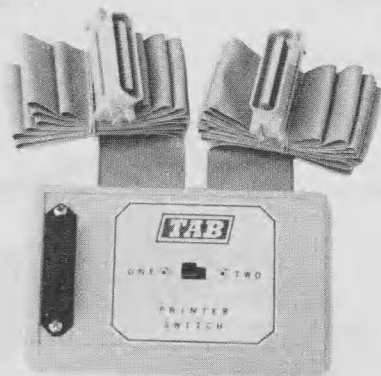
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## NEW PRODUCTS

inches wide. For more information, contact Olympia USA Inc., Box 22, Somerville, NJ 08876. Reader Service number 413.

### SureStroke of Compatibility

SureStroke keyboards for the IBM PC and Apple II feature an extra-large return key, ten top-row function keys, a ten-key numeric key pad with separate cursor keys above, mechanical key contact, three-key rollover and audible key click (if desired). The plug-compatible SureStroke 911 (Apple) and the SureStroke 912 (IBM) sell for \$199.95 from Titan Data Systems, 320 Fifth Ave., New York, NY 10001. Reader Service number 405.

It includes a manual originate mode and a manual- or autoanswer option. It determines and matches transmitting speed and mode of a calling modem, and features local analog loopbacks, a built-in test pattern generator and digital loop-back diagnostics that you can invoke locally or remotely.

The Model 3024 is available from Micom Systems Inc., 20151 Nordoff St., Chatsworth, CA 91311. Reader Service number 410.

### Heathkit Goes Portable

Heathkit has joined the PC-clone portable race. But are you rough enough and tough enough to build and lug this 35-pound 16-bit por-



The DialNet 3000 modem operates at 2400 bps on dial networks.

### 2400 bps Dial Modem

DialNet 3000 Model 3024 (\$795) is a full-duplex modem available for use over the dial telephone network. It passes synchronous or asynchronous inputs at 2400 bits per second. It can communicate at 2400 bps with V.22 binary synchronous-compatible modems or at 1200 bps with Bell 212-type units.

table machine? The HS-161 Portable PC (\$1999 for two-drive 128KB) is available in single or dual 5 1/4-inch (360KB) floppy drive configurations, and both come with 128KB of RAM (expandable to 640KB), two RS-232C serial ports, one Centronics-compatible parallel port, color monitor output, four open IBM-compatible expansion slots and a built-in nine-inch amber monitor with an eight-level gray-scale feature.

## SMALL C FOR IBM-PC

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## NEW PRODUCTS

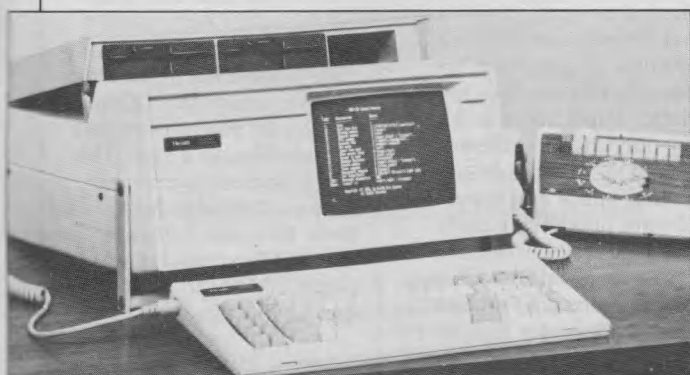
It uses a 16-bit Intel 8088 processor and the MS DOS operating system as well as an IBM-expansion bus to provide electrical and physical compatibility with many expansion boards designed for the IBM PC. The keyboard features an enlarged L-shaped return key and a double-wide shift key located in the standard typewriter positions. It measures 19½-inches wide by 8¾-inches high and 19¼-inches deep. A fully assembled, two-disk 128KB configuration sells for \$2999.

You can write to Heath Co. at Dept. 349-185, Benton Harbor, MI 49022. Reader Service number 402.

after installation, and a 12-foot snap-in cord model, which replaces your present phone cord. Dataguard won't disrupt your normal telephone function and it's FCC approved. It's manufactured by Control Industries, Box 6292, Bend, OR 97708. Reader Service number 412.

### IBM Color Graphics Card

The Hercules Color Card (\$245) adds color graphics to your IBM PC or XT and also includes a parallel printer port. Because it's half the size of the IBM



The Heathkit HS-161 Portable PC is an 8088-chip IBM compatible featuring flip-up drives and a nine-inch screen.

### Modem Priority Dedicated Line

When you're logged on with your modem, Dataguard (\$39.95) will ensure you're not cut off. Designed to provide modem users with security and privacy, Dataguard avoids data loss and disconnects if someone accidentally picks up another phone on the same line. Dataguard acts as a dedicated line automatically.

In less than two minutes, you can install it on any phone that may interfere with your modem. It requires no external power source or on/off switch.

Dataguard comes in two models—an in-phone model, which is not visible

card, you can insert the Hercules card into one of the XT's short expansion slots, freeing up the long slots for full-size cards.

The Hercules card is compatible with all color graphics software for the IBM color card. For more information, contact Andrew Fischer, Hercules Computer Technology, 2550 Ninth St., Suite 210, Berkeley, CA 94710. Reader Service number 407.

Microcomputing prints information on new products based on information supplied to us by manufacturers. Inclusion of a product does not signify an endorsement.

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**Formats:** Most disk formats available

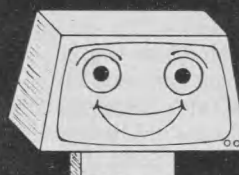
**Cost:** \$150 complete program  
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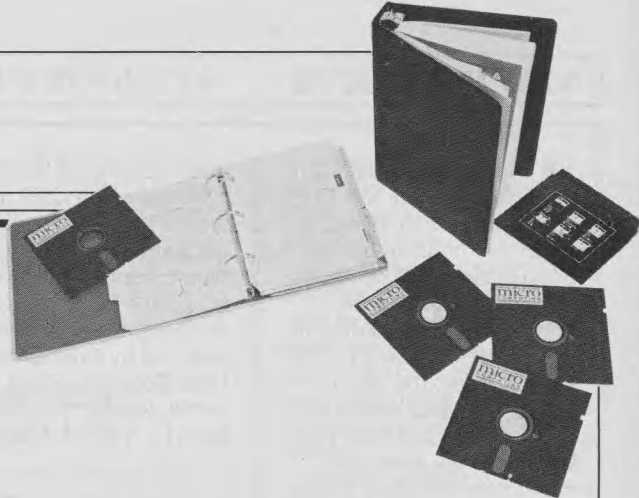
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# NEW SOFTWARE

Edited by Amy Campbell



## Program in Plain English

Good news for English majors: if you can distinguish nouns from verbs, then you can program an MS DOS/PC DOS-based microcomputer in as little as four hours! Well, at least that's what the folks who've developed the new programming language, Plain English (\$595), say.

That's because Plain English consists of an initial vocabulary of about 40 starter verbs (like print, subtract and move cursor) you use as building blocks to create endless combinations of new and refined verbs. Nouns such as fraction, quotient and length are basic to the vocabulary; you can also define your own nouns, such as employee name, gross pay and so on.

Plain English is similar in concept to the English-oriented operating system Savvy and also similar to Forth in its use of building blocks. But what makes Plain English unique is that it requires no special symbols or code and is, therefore, self-documenting. You create programs in your own vernacular.

The language runs on IBM PC, XT, PCjr and compatibles. More than 24 programs are available in the language, and scientific and multi-user supplements to Plain English are scheduled for release by the end of 1984.

Plain English is a product of Common Language Systems Inc., 100 E. Sybelia Ave., Maitland, FL 32751. Reader Service number 420.

## Make A Good Thing Better

If the thrill has gone out of your romance with dBase II... if those ads for newer, faster, flashier database managers have turned you sour on your old faithful friend, perhaps you need to add a little spice to your drab dBase II existence. You can soup up Ashton-Tate's dBase II with the software utility dFastest (\$89.95) from Software Research Technologies.

The company claims dFastest lets you sort files 33 times faster than dBase II and five times faster than current dBase utilities. dFastest can sort dBase II files on up to 32 fields, rescue bad data files, copy files to another disk and pack a dBase II data file.

The utility works within dBase II so you don't have to leave dBase in order to run it on CP/M, MS DOS or PC DOS. You can also incorporate the program into applications developed with the dBase language.

For more information on dFastest, contact Software Research Technologies Inc., 3757 Wilshire Blvd., Suite 211, Los Angeles, CA 90010. Reader Service number 421.

## And Better Still... dB/Compiler

dB/Compiler is the first compiler for Ashton-Tate's dBase II. It translates a dBase II program into low-level directly executable modules. The modules are generally smaller than the original application, and they don't require dBase II to operate. The results are less disk space and fewer software purchasing costs as well as faster execution of some applications. Compiled versions also protect source code better than encryption methods do.

dB/Compiler is available in single-environment formats for CP/M-80, CP/M-86 and MS DOS for \$750.

Cross-linkers that let you produce code for additional environments are available for \$350 each. Contact WordTech Systems Inc., Box 1747, Orinda, CA 94563 for more information or a demonstration program. Reader Service number 422.

## Eight Utilities For Your Mac

Utilities for the Apple Macintosh (\$45) consists of eight programs for use with the Microsoft Basic interpreter. Programs include a variable cross-referencing utility, a program to display an ASCII file on-screen and one to print out ASCII files.

There are utilities that let you set one of 15 bit rates for the Com1:RS-422 input/output port, dump any file on the screen in both hexadecimal and ASCII values and save data coming over the Com1: port to disk (so you can port source code to the Macintosh from another computer). Other utilities let you remove and rename files on a disk. The disk and complete source code are available from Basic Business Software Inc., PO Box 26311, Las Vegas, NV 89126. Reader Service number 423.

## CP/M and MS DOS Font Control

You can get a variety of high-quality type fonts from your Epson RX, MX or FX printer with WordStar and a new software utility called FontStar (\$60). The program lets you create up to 20 high-resolution fonts that you can incorporate into your documents. Typefaces include Helvetica Light, American Typewriter, Bodoni, Broadway, Flash Bold, San Serif Shaded, Commercial Script, Old English and more. It supports all standard WordStar features, such as underlining, boldfacing and super- and subscripts.

Also included is a program that lets you define your own fonts or modify existing one. Foreign language characters are



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SOFTWARE RESEARCH  
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optional. For more information, contact MicroNova, RR#5, Canning, Nova Scotia, Canada B0P 1H0. Reader Service number 424.

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Helvetica Italic  
Helvetica Medium  
American Typewriter  
Bodoni  
Broadway  
Flash Bold  
Sans Serif Shaded  
Commercial Script  
Micrograma Extended  
Old English

FontStar gives your Epson printer control of 20 high-resolution type fonts like these.

## Epson QX-10 Graphics Utilities

MicroNova has also released two products for the Epson QX-10. MicroPlot (\$60) is a graphics package for the Pascal programmer that consists of a searchable library of more than 100

graphics routines you can incorporate into a Pascal/MT+ program during link time.

PlotPak (\$60) is a collection of stand-alone graphics utilities that lets you develop bar and pie charts, bell curves, trend lines, line graphs and log plots. For more information, contact MicroNova at RR #5, Canning, Nova Scotia, Canada B0P 1H0. Reader Service number 434.

## Growing Up With Data

Wouldn't it be great if someone made a database program that grew as your computing needs, hardware configuration or business grew? Well, the Omnis family of software lets you progress from file management through sophisticated information management to comprehensive database management and custom applications development.

Organizational Software Corp.'s upgradeable trio for the IBM PC and XT, Apple IIe and III, Apricot, Victor and other microcomputers consists of: Omnis 1, The File Manager; Omnis 2, The Information Manager; and Omnis 3, The Database Manager. (Omnis 2 and Omnis 3 are available also for the Macintosh and Lisa.) Each program offers flexible screen and report formatting, and all are file compatible with each other.

Omnis 1 (\$95) is suited for the first-time user. It can handle mailing list maintenance, file maintenance, time management, diaries, custom reports and list/letter merging. It can search up to three characteristics.

Omnis 2 (\$195) builds on Omnis 1 and offers user-designed multiscreen records with up to 120 information items per record and 12 automatically main-

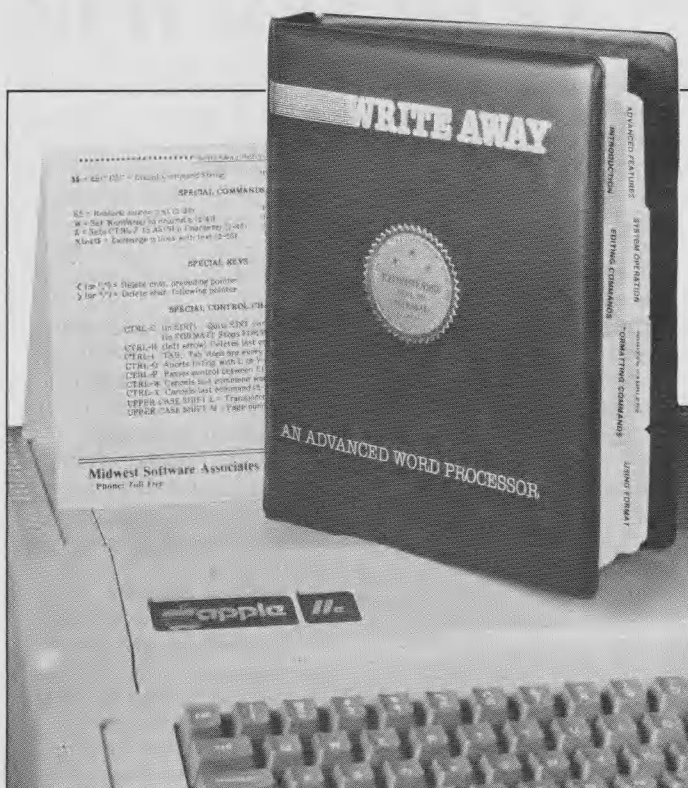
tained index files per record. It performs calculations on-screen and can retrieve records via up to 50 different selection criteria. Also included are global update and delete as well as hard disk and multi-user support.

Omnis 3 (\$295) adds the power. It can support up to 12 open files simultaneously, operate as a relational or hierarchical database system and generate complete turnkey systems for a wide variety of applications. Its flexible screen and report formatting links with user-defined entry sequences so you can use screen overlays and custom messages or menu screens. For more information, contact Organizational Software Corp., 2655 Campus Drive, Suite 150, San Mateo, CA 94403. Reader Service number 430.



WordTech Systems introduces the first compiler for dBase II.





Write Away gives you advanced word processing and terminal communications in an integrated package.

## Type and Transmit On Your Apple

Write Away 5.0 (\$175) is a full-feature word processing system for the Apple II series of microcomputers that integrates a complete terminal communications program.

A DOS-based word processor, Write Away lets you print form letters from mailing lists; the program can read files created by pfs:File and DB Master. It also features soft hyphenation, block move, copy and delete, and widow line suppression.

The terminal program supports autodial, auto-answer, full duplex, half duplex and unattended operation and lets you read a file from disk as well as transmit and capture files. It automatically recognizes most add-on boards, including the Apple 80-column boards.

Unprotected, you can

mount the 64KB RAM program on hard disks and use it on local area networks. Write Away is published by Midwest Software Associates Inc., 1160 Appleseed Lane, St. Louis, MO 63132. Reader Service number 425.



Hayes aims to please with its easy-to-use database management system Please.

## Take My Database, Please

Please (\$349) is Hayes Microcomputer Products' (you know, the modem people) entry into the software market. Promoted as a fast and easy-to-use database management system for the IBM PC, it includes a help feature that lets first-time users create a database on their first time through the system.

The menu-driven program can manipulate up to 999 characters per field, 99 fields per record, 2000 characters per record and several million records per database, depending on system capacity.

You can change database structure, merge and copy databases and transfer data with Please. You can also integrate data from other database products, word processing files or spreadsheets without expensive add-ons. Optional data management templates (\$29.95 each) are also available for mailing list, membership, applicants, contacts, appointments, employee files, household

records and other similar databases.

Please requires 128KB RAM and two double-sided drives or a hard disk. Contact Hayes Microcomputer Products Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. Reader Service number 426.

## Transend: Three Communications Products

Three communications programs have been announced by Transend Corp. They are Easy Com Easy Go for the Apple II family of computers and PC Pipeline and PC Communications Manager, both for the IBM PC.

Easy Com Easy Go runs under ProDOS but can transfer files from any Apple disk, including SOS, DOS 3.3, CP/M and Pascal. It uses an index card-like screen to get the novice online quickly and to keep things simple for the pro. It fully supports all Apple IIc features. Keyboard macros are available with up to 22 user-defineable macros per stored phone number. You can store more than 12 different numbers and automatic log-on sequences.

PC Pipeline is a terminal communications package for the IBM that lets you program 20 instructions per phone number. The number of phone numbers you keep is dependent only on your disk space. Each phone number can have up to 40 characters. When coupled with the electronic mail upgrade, PC Pipeline becomes Transend PC Communications Manager. The electronic mail portion uses in basket, out basket and wastebasket screen icons to simplify the messaging process.

The IBM products have file transfer capabilities using the Ward Christensen



## NEW SOFTWARE

Xmodem protocol. Line, pacing and XON/XOFF protocols are also supported. An instant peek feature lets you look at the first 16 lines of the file before you send it, and you can access MS DOS without leaving the program. All three products are autodial/autolog-on and come with \$400 worth of offers from selected data sources.

For more information on Transend's communications programs, contact the company at 2190 Paragon Drive, San Jose, CA 95131. Reader Service number 433.

### Creating Graphics Reports

With Condor Graf (\$295), a menu-driven graphics package, you can quickly condense stacks of numerical reports and figures into a choice of ten charts or graphs. Compatible with most printers and plotters, it can run with any program using DIF or ASCII files.

To use the program, you choose the desired chart and tell Condor Graf where to find the data—it requires no setup or programming. Through use of a menu, you can customize charts, using shading and scaling, specify the number of pie chart segments and add titles and descriptive text. Modifications can be stored on disk.

Condor Graf requires CP/M-80 version 2.2 or greater, CP/M-86 version 1.0, MS DOS version 1.0 or greater or PC DOS version 1.1 or greater. CP/M-80 requires 64KB of RAM; PC DOS, MS DOS and CP/M-86 versions require 128KB RAM. All versions require a graphics controller.

For more information, contact Condor Computer Corp., 4984 El Camino Real, Suite 125, Los Altos, CA 94022. Reader Service number 428.

### ChartStar Business Graphics

ChartStar (\$395) from MicroPro is designed to handle all your graphics needs in the office. In addition to text, line, pie and bar charts, it produces organizational, scatter and Gantt (project management) charts.

ChartStar lets you choose from five font types and includes three-dimensional pie and bar charts as well as curve-fitting charts. It uses menus, function keys and a fill-in-the-blanks features that makes the software easy to use. You can also customize graphics with headings, legends, footnotes and axes labels.

The program can access data files from MicroPro's CalcStar, InfoStar and PlanStar as well as spreadsheet programs like Lotus 1-2-3, VisiCalc, SuperCalc and Multiplan. It requires an IBM PC with 192KB RAM and two disk drives. It supports the IBM Color/Graphics Adapter and the Epson MX-80 or MX-100 printers with Graftrax, as well as the IBM graphics printer, the Epson FX printer, the IDS Color Prism printer and the Hewlett-Packard 2-, 6- and 8-pen plotters.

For more information, contact MicroPro International Corp., 33 San Pablo Ave., San Rafael, CA 94903. Reader Service number 431.

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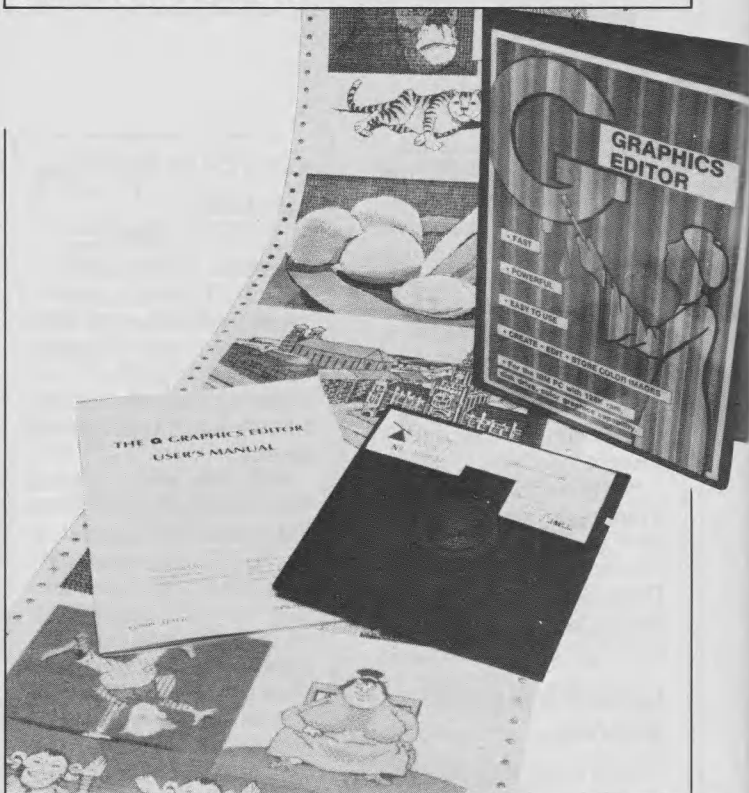
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## The UNIX Guide

Pacific Micro Tech, 1983  
5819 Poinsett Ave.  
El Cerrito, CA 94530  
Softcover, 118 pp., \$25

The *UNIX Guide* fills a gap in the literature on Unix and does it well. Currently available Unix books typically are either textbooks or reference manuals, both aimed at people who want to learn to use Unix. The *UNIX Guide* is useful for the computer professional who's asking questions about using Unix, such as:

- Will Unix meet my current software needs?
- Which version of Unix is most appropriate for me?
- What are the capabilities of Unix?

This book is exactly as it's labeled, a guide to orient new and prospective users. Besides the well-organized text, there are six clearly laid out appendixes, including an index to Unix tutorial documentation and clear summaries of the enhancements offered with different Unix versions. This entire guide is only 118 pages, making it accessible to someone who wants an accurate overview. Don't let its compact size dissuade you; it's concise, readable and comprehensive.

Just before reading *The UNIX Guide*, I'd been researching the differences between System V and System III in order to write a new pocket reference guide for System V. Armed with full sets of System III and V user's manuals, I spent six hours searching through the manuals to find the differences. My *UNIX Guide* arrived the next day. In an hour I read a summary that had enough depth to explain the list of differences I had found. I even discovered some I had missed in my search through the manuals. The capabilities of Release 7, System III, System V, and the Berkeley and Unisoft enhance-

ments are clearly delineated throughout the text and in the appendixes. Unfortunately, the Berkeley enhancements are not divided into versions 4.1 and 4.2.

### Concise

There are 31 sections in the book, arranged by topic. Each section has a clearly written description followed by a list of commands relevant to the topic and references to related commands and topics. The first sections describe the major concepts necessary to understand enough Unix to use the guidebook. In four pages, Pacific Micro Tech concisely summarizes how Unix performs multi-user and multitasking functions, defines the kernel, explains the file system and explores the capability of the shell. The last paragraph in each section explains where to find more detailed information.

The next sections cover text editing. The book was obviously prepared using Unix text processing and quick visual summaries are presented using the Unix command `tbl`. The five commonly available editors are discussed within the framework of how different types of users will react to them. The editors, formatting commands and graphics commands are then described.

After text processing comes networking and communications. The differences in communications ability between System V and previous versions are clearly explained. Commands available in each area are listed with a short description of their functions.

The text is written so that the first reading focuses on putting the topic in perspective and exploring capabilities, and the second reading focuses on the commands and detailed information contained in the tables and lists. This satisfies the needs of various levels of users in one document, without overwhelming the newer user or failing

to provide the technical user with enough information.

The guide then moves into the software development field: compiler writing tools, shell language and programming aides, using the C language with Unix and basic program development tools. The file manipulation tools are explained and differentiated, including various spooling and printing commands.

The next sections cover the system administrator and maintenance commands. Topics include system maintenance and accounting, device control, file system maintenance and repair, installing releases, archiving, monitoring activity and system startup and shutdown.

The last sections are relevant for those planning software development, database, networking or real-time applications. A readable description of interprocess communications contains information on its function in the different releases. The library functions are introduced with a narrative summary and then presented by functional groups in 25 pages of tables. This section is indexed separately from the rest of the manual.

### Perspective

The concluding section on optional software, available from microcomputer manufacturers, presents examples of software available rather than trying to be a comprehensive summary. It's limited to one database package and languages (Pascal, Cobol, Fortran 77 and Basic). As such, it doesn't give a fair perspective to the person interested in buying office automation. The reader is pointed instead to manufacturer's representatives of OEMs, the typical distributors for Unix-based applications software.

Even this brief treatment of available software is unique in the



## BOOK REVIEWS

current Unix literature. It illustrates the philosophy of *The UNIX Guide*: to provide the information new and prospective users need to orient and familiarize themselves with Unix. Pacific Micro Tech started this service with the *UNIX System III Guide*; I hope they continue to keep up with new releases.

Irene Pasternack  
Seattle, WA

### dBase II for Every Business

Robert A. Byers  
Ashton-Tate, 1983  
10150 W. Jefferson Blvd.  
Culver City, CA 90230  
Softcover, 339 pp., \$19.95

If you're serious about programming with dBase II, I wholly recommend *dBase II for Every Business* as an immediate addition to your reference library. Robert Byers, author of *Everyman's Database Primer*, again comes to the rescue of dBase II users with this fine intermediate-level textual treatment of dBase II applications.

Although the first three chapters contain a brief overview of dBase II and some material in the final chapters is entry level, the balance of the text assumes familiarity with dBase II commands, structure and syntax and some programming experience. Reading the primer mentioned above would be good preparation to tackling this guide.

Chapters 4 through 10 build necessary components of a database management system for a book distributor as a tutorial of typical applications for most small businesses. Included in the broad range of topics (with illustrative programs and subroutines) are customer file management, mailing lists, inventory, sales order entry and invoicing, and accounts receivable. Although the different modules can be integrated into a unified system, Byers deliberately varies programming methods utilized to demonstrate the flexibility and alternative approaches available in dBase II.

### Mystique

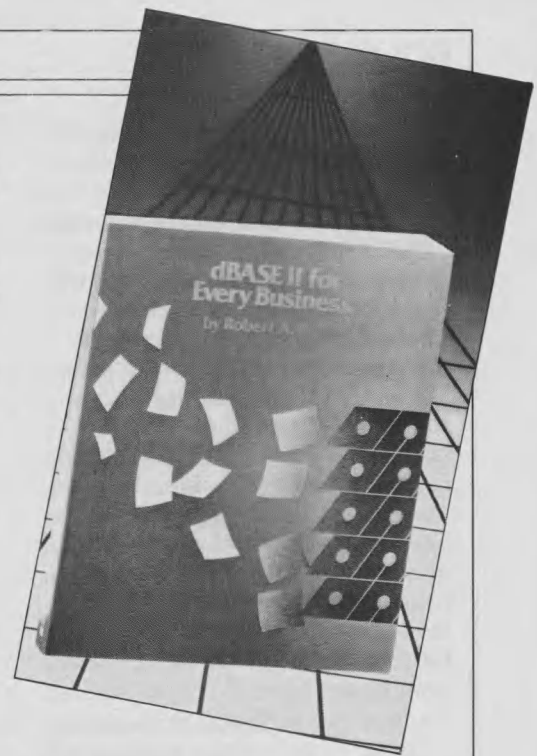
Careful review of the way macros are used in the routines, commands are abbreviated, strings manipulated and databases linked helps you unlock the mystique and power of dBase II to improve and expand your programming horizons. The sample programs are an invaluable source of common programming application structures that are easily modified, adjusted and combined to fit your specific requirements.

Tapping the potential of the Report function is the subject of Chapter 11, which provides interesting insights into editing a report file with a word processor. The following chapter, dealing with data manipulations, also contains programs to convert to and from Julian dates. Although the subject matter of Chapter 13 is data entry techniques and screens, including error checking discussed at a relatively simplistic level, for some reason no mention is made of Zip, the dBase II screen editor. Since Zip is an integral part of the dBase II system and expedites production of data entry screens, it warrants at least a chapter of tutorial attention. To me, this is a major sin of omission in an otherwise fine book.

The last chapter furnishes tips on debugging, use of CHR for print functions, some interesting suggestions on speeding up dBase II action and ideas for enhancing screens, particularly on the IBM PC. With the index and table of contents, you can find particular items of interest quickly and easily.

You'll find this volume an indispensable reference manual in creating your own programming applications. The considerable variety of techniques that are detailed in the subroutines—even entire subroutines—are readily adapted to accomplish a wide range of business functions. Byers' practical hints facilitate constructing your personal database system.

The first three appendixes listing commands, functions, limitations (operating parameters) and error messages are copied verbatim from the dBase II manual and just



waste space. Expanding the original comments by Ashton-Tate on recovery and corrections after an error message, and perhaps including an explanation of some of the messages Ashton-Tate left out, would be decidedly more useful. Appendix D details ASCII codes and Appendix E consists of supplementary programs relating to the sales entry and inventory programs.

Softbound on 8¼ by ten-inch pages, the text is printed in an easy-to-read double-column format. It's clearly written with many screen displays in addition to actual program coding. Program formatting uses consistent indentation to highlight logical relationships as an aid to analysis of the program flow.

### Another Winner

Most of the subtleties of programming techniques are discussed in the text. However, careful study of the programs reveals additional tricks or shortcuts not explained in either the dBase II manual or the text that you'll find helpful in your own programs. It's assumed you have version 2.4, the most recent version of dBase II, since the advantages of the new and expanded functions and capabilities are employed.



## BOOK REVIEWS

Byers has another winner for the dBase II community. If you're writing dBase II applications, *dBase II for Every Business* belongs within arm's reach. Ashton-Tate should consider including both of Byer's books with each copy of dBase II since they're more comprehensive than the present manual and give a better view of the scope and possibilities of the system. *dBase II for Every Business* includes essential operational information that should be in the original documentation. Undoubtedly, many micro owners will be encouraged to use dBase II to apply the solutions described in this tutorial to their database management problems.

**Charles R. Perelman**  
Los Angeles, CA

### The Complete FORTH

Alan Winfield  
John Wiley & Sons Inc., 1983  
605 Third Ave.  
New York, NY 10158  
Softcover, 131 pp., \$15.95

Until recently, Forth has suffered the same fate as Rodney Dangerfield: a lack of respect. It's been treated as an arcane curiosity, ridiculed for its write-only syntax or, at best, considered an intermediate-level (not high-level) language. Many people have been irreversibly intimidated by the Reverse Polish Notation (RPN) this stack-oriented language utilizes.

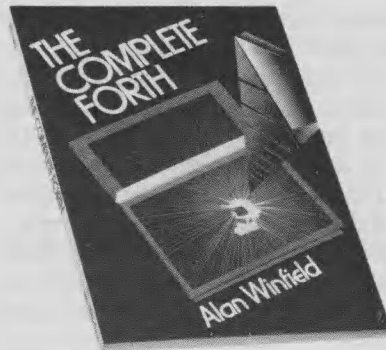
This is no longer the case. The current high level of interest in the language is due to two factors: the availability of inexpensive public-domain Forth interpreter/compiler for most micro- and minicomputers, and the appearance of lucid, easy-to-read books on the subject. The Forth Interest Group (FIG) of San Carlos, CA, has provided the former ingredient. Several authors have provided the latter and I believe that Alan Winfield's *The Complete FORTH* is a worthy addition to this field.

#### Not Stuffy

Winfield's book gives you an ex-

cellent panoramic view of Forth-79, the standard dialect in greatest use today. This is only natural, as Professor Winfield (a lecturer in computer programming in Hull, England) has written a Forth compiler himself. The author's style is a terse, understated British standard prose, pleasantly conversational, eminently understandable and not at all stuffy.

Readers will appreciate several thoughtful aspects of *The Complete FORTH*. For instance, numerous examples of Forth usage are dispersed throughout the book. More to the point, Winfield repeatedly compares these Forth words to equivalent routines in Basic, which is a much more familiar language to most microcomputer users.



You'll like other features as well. The table of contents has plenty of detail. The glossary explains many of the terms most commonly used by Forth programmers. An index of Forth-79 Standard dictionary words and their preferred pronunciations is included (so that you can speak correct Forth as well as write it). A tear-out Forth-79 handy reference card, patterned after the FIG model (but of higher print quality) appears adjacent to the back cover. Each chapter has several summarizing exercises, with the answers at the rear of the book. *The Complete FORTH* would make a perfectly satisfactory textbook in a university-level computer language course.

#### Not Cutesy

In strategic locations, Winfield

provides simple line-drawn illustrations of the stack effects of Forth words. Other diagrams show how to properly nest Forth control structures, such as the `do...loop`, `if...else...then` and `begin...while...repeat` constructs. I'm glad he avoided using a cutesy illustration style, as it tends to detract from the seriousness of the material being presented.

Winfield provides an outstanding example of structured programming technique in the book's final chapter, in which he creates a complex real-time Pong video game literally from the top down. Good show!

He addresses only the 79-Standard version of Forth, to the exclusion of all other forms and dialects. There is understandably no mention of the new Forth-83 Standard, which was being written while *The Complete FORTH* was in press; inexplicably, Forth-78/FIG-Forth is largely ignored, too.

#### Serious Omissions

Some omissions are more serious. The only reference made to the Forth assembler was a brief mention in the glossary at the book's end. There's no discussion of multi-user or multitasking forms of Forth such as PolyForth. Winfield's description of the Forth dictionary structure is skimpy and oversimplified (for example, the header "smudge bit" used by the compiler to prevent execution of partially compiled new definitions was left out completely).

Winfield doesn't discuss important real-world issues such as cross-compilation, generation of headerless code and ROMable code, use of program segment overlays and limitations to source code transportability. He is silent on the subject of Forth variants (i.e., Stoic, Magic/L) and commercial suppliers (i.e., Forth Inc., FIG, Mountain View Press, Laboratory Microsystems, Miller Microcomputer Services and so on). Practical matters, such as when to select a version of Forth that runs as a task under a separate host disk operating system (captive Forth) versus a stand-alone Forth (which is its own DOS), aren't addressed.



Also not mentioned are programmer productivity tools like threaded-code decompilers, callfinders and code translators.

The book has some limitations that are minor but frustrating. For example, the combination of an extremely small type font for footnotes and use of a rough-surfaced paper leads to poor legibility where it's needed most: explanations of nonobvious points.

The above comments aren't meant to impeach Winfield's very fine work but merely to point out that the book's title, *The Complete FORTH*, is at least a misnomer. The information not covered by Winfield must be gleaned elsewhere.

In summary, then, Professor Winfield's book, *The Complete FORTH*, is a well-written, organized and readable text on the structure, syntax and general use of the Forth-79 Standard programming language. It's comparable to the best currently available publications on the subject. Winfield omits little that the Forth novice would like to know, yet he has left out information in several areas that professional users would require. Overall the book is excellent, but in fairness should be retitled: *The Complete FORTH-79 Standard*.

**Paul Frenger, M.D.**  
Houston, TX 77024

### Simple Interfacing Projects

Owen Bishop  
Prentice-Hall Inc., 1983  
Englewood Cliffs, NJ 07632  
Softcover, 168 pp., \$8.95

*Simple Interfacing Projects* provides the answer for those rainy weekends or other times when you wish you had a challenging project. Owen Bishop has created a dozen easy-to-build circuits that enhance the capability of your microcomputer and introduce you to interfacing techniques and applications.

#### New Uses

The projects cover a wide range of interface applications, simply designed but truly functional. You won't build, play with and forget

these projects. Instead, you'll find many of these circuits are useful extensions of your computer system. They'll transform it into an active tool that performs useful functions and act as a foundation for your own enhancements and applications.

An Electric Kettle Controller project interfaces your computer and home electrical power to an appliance of your choice, turning it on and off via software control.

The ROM Board is a 2716 EPROM programmer and spare 2KB ROM socket for your system. This project includes information on how to write control software for the programmer and circuit designs for the programming high-voltage supply.

Graphics interfaces are represented by the Digitizer Pad and Graphics Tablet projects. The digitizer pad lets you enter graphic data into the computer by moving a finger or pointer across a grid of input sensors. This interface is entirely digital. The Graphics Tablet uses analog-to-digital converters. Analog inputs from variable resistors connected to a stylus control arm indicate the relative position of a drawing stylus. The analog data is converted into a digital input. Movement of the stylus is copied onto the screen of the computer.

Other projects involve modems, sound generation and clock applications.

Bishop contends that the projects can be adapted for use on any microcomputer system that has access to the address, data and control leads. Emphasis is given to Z80-based systems. Arrangements for interfacing to Apple II systems are briefly discussed in the introductory chapter.

This chapter provides a summary of hardware and software interfacing theory with an emphasis on information directly applicable to the projects. Discussions include: system architecture, digital ICs, logic levels, address decoding, reading and writing, bus interfacing and construction techniques. Power supply designs sufficient to operate the projects are provided.

Since this chapter is intended to be an overview, someone with limited experience or unlimited curiosity may desire a more complete reference. Still, more than enough information is given to successfully complete the projects.

While each project is clearly documented with a circuit diagram and description of construction and operation, the reader who's not familiar with European circuit notations may sometimes become confused with the schematic symbols and component values. For example, a 4700 ohm resistor, commonly shown as 4.7k, appears in the book as 4R7. Similar treatment is given to capacitors with decimal values. A 3.3 $\mu$ F capacitor appears in the book as 3 $\mu$ 3. Nanofarad notation is frequently used for values of capacitors. Some components have unfamiliar but correct schematic diagrams. In one case, the familiar zig-zag symbol for a resistor is replaced with a long narrow rectangle.

Most of the ICs used in the book are readily available and include 74LS series digital ICs, CD 4000 series CMOS and MC6800 series microprocessor interface chips. A couple of the projects require ICs and other semiconductors that don't have familiar part designations. No manufacturer or source information is listed for these parts. Perhaps some general purpose transistors can be substituted for the transistor, at least, with favorable results.

#### Good Format

The presentation of the projects follow an orderly, easy-to-read format. A summary at the beginning of each of the 12 projects gives you an idea of the function, ideas for possible applications and an indication of the level of complexity of the circuit. The number of ICs required and interface requirements for data, address and control signals are also given.

A functional description of the operation of the circuit follows the summary. It includes references to a schematic diagram illustrating the function of individual components and the overall circuit.



## BOOK REVIEWS

A section describing project construction techniques provides you with assembly tips and indicates any critical component placement and handling precautions. A complete parts list is in this section.

Programming for each project is the next item covered. General information and tips for creating software to control the interface are given. Since the projects are designed to interface to a wide variety of systems, Bishop provides few specific software routines. An exception is the inclusion of spe-

cific programming instructions for the data and control registers of a programmable peripheral interface chip used in a project.

Finally, some chapters have a section on troubleshooting, tuning and testing the completed interface.

With a set of instructions like this and a little care, any or all of these simple interfacing projects can be successfully completed.

**Norbert E. Yankielun, P.E.**  
Westfield, NJ

## From the MC Bookshelf

Primers seem to be the "in" thing this month. Two releases from The Waite Group are *Pascal Primer for the IBM PC* by Michael Pardee (New American Library, 1633 Broadway, New York, NY 10019; \$17.95) and *Assembly Language Primer for the IBM PC & XT* by Robert Lafore (same publisher; \$21.75). Each promises to bring you to a competent programming level in its respective language.

Also from New American Library is *Database Primer* (\$9.95) by Rose Deakin, an "easy-to-understand guide to database management systems."

Chao Chien has written two new books: *Assembly Language Made Easy for the TRS-80* (\$18.45) and *Programming the IBM Personal Computer: Assembly Language* (\$18.45). Both are 1984 releases from CBS College Publishing (383 Madison Ave., New York, NY 10017). The TRS-80 material is written as a tutorial, and the IBM PC book is designed for beginners.

If you're making the transition from an eight-bit microprocessor system to a more sophisticated 16-bit system, Ian R. Whitworth's *16-Bit Microprocessors* (Prentice-Hall Inc., Englewood Cliffs, NJ 07632; \$15.95) may be the answer for you.

*The TK!Solver Book: A Guide to Problem-Solving in Science, Engineering, Business & Education* by Milos Konopasek and Sundaresan Jayaraman (Osborne/McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710; \$19.95) is a comprehensive guide for both computer novices and computer professionals who want to make the best possible use of TK!Solver.

The professed purpose of *Experiments in Logic and Computer Design* by Albert Y. Teng and William A. Malmgren (Prentice-Hall Inc., \$15.95) is "to provide hands-on experience in general digital logic and computer systems through a set of carefully developed experiments." The only prerequisites are some experience in assembly language programming and a basic knowledge of Boolean algebra and digital systems.

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# CALENDAR

## September 3-5 London, England

The City on the Thames will play host to the **IBM System User Show** September 3-5. The show is designed to be the main European exhibition for IBM users, from mainframes to micros.

The exhibition will feature product displays from both British and international companies. A conference, featuring eight half-day congresses and 15 well-known IBM specialists, will be held in conjunction with the exhibit.

For more information, contact Peter Walker Associates, 32 Fitzroy Square, London W1P 5HH, England; 01-388-9871.

## September 5-7 Anaheim, CA

The **National Software Show**, a Raging Bear Productions event, is scheduled for the Anaheim Convention Center September 5-7. The software-only show will feature more than 800 booths for new products and product update announcements and displays.

More information can be obtained from Philip Russell—call 415-924-1194 or, from outside California, 800-732-2300.

## September 6 Newton, MA

## September 25 Detroit, MI

The 14th series of **Invitational Computer Conferences** will kick off its fall shows with two September dates. The show will be in the Boston area on the 6th and in Detroit on the 25th.

The conferences are designed to provide an exclusive arena for volume buyers to meet potential suppliers. Only OEM manufacturers may exhibit their wares and guests may attend by invitation only.

In addition, conferences offer a full day of technical seminars presented by OEM suppliers.

For more information on any of the conferences, contact Suzanne Hubner, conference director, B.J. Johnson and Associates, 3151 Airway Ave., #C-2, Costa Mesa, CA 92626; 714-957-0171; Telex 188747 TAB IRIN.

## September 6-8 Atlanta, GA

One hundred presentations on a variety of microcomputer applications will be featured at the **1984 Annual Conference of the Microcomputer Users Group of the University System of Georgia (MUG/USG)**. The conference will be at the Institute of Technology in Atlanta.

The conference will be preceded by two days of tutorials on the use of microcomputers. For more information, contact Dr. Willis B. Hayes, Geology Department, University of Georgia, Athens, GA 30602.

## September 6-8 Washington, DC

The capital city will host a workshop on September 6-8, **Personal Computer and STD Computer Interfacing for Scientific Instrument Automation**. The workshop is sponsored by Virginia Polytechnic Institute and State University.

Sessions are designed to be intensive and personal—participants will be wiring and testing interfaces for themselves. For details, contact Dr. Linda Leffel, CEC, Virginia Tech, Blacksburg, VA 24061; 703-961-4848.

## September 11-13 Boston, MA

Engineers, designers, scientists and technical managers involved in electronic imaging, take note—the first **Electronic Imaging Exposition and Conference, Electronic Imaging '84**, is slated for September 11-13 at the Westin Hotel in Boston.

The conference will cover all aspects of electronic imaging components, equipment and systems. Topics from radiation sensors to fiber optics will be addressed as well.

**Electronic Imaging '84** will feature technical seminars, workshops, an industry forum and two keynote addresses. For more information, contact Electronic Imaging '84, Morgan-Grampian Expositions Group, 2 Park Ave., New York, NY 10016-5667; 212-340-9780.

## September 11-13 Dallas, TX

**Not For-Cowpokes-Only:** The Dallas Convention Center is the site of two concurrent computing events. **Midcon/84** and **Mini/Micro Southwest-84** will both be in town September 11-13. For more information on either show, telephone Nancy Hogan or Jerry Fossler at 213-772-2965.

## September 11-14 Los Angeles, CA

Unix enthusiasts will be happy to discover the **Unix Systems Expo/84**, which will be September 11-14 at the Los Angeles Convention Center. The expo is designed to be "a vehicle for connecting Unix vendors, resellers and end users."

More than 200 Unix-related vendors will be on hand; in addition, several presentations and panel discussions are planned to offer attendees a comprehensive understanding of Unix.

For more information, contact Computer Faire Inc., 181 Wells Ave., Newton, MA 02159; 617-965-8350.



# CALENDAR

## September 12-14 Chicago, IL

The Hyatt Regency in the Windy City has been chosen to house the fifth annual **Software Expo**. The expo will feature three days of conference sessions in addition to an exhibition.

For more information, call or write Software Expo, 2400 E. Devon Ave., Suite 205, Des Plaines, IL 60018; 312-299-3131.

## September 13-16 Minneapolis, MN

**Computer Technology for the Handicapped**, a conference scheduled for the Radisson South Hotel in Minneapolis, will feature three three-hour topical presentations dealing with areas central to handicapped technology—authoring systems, robotics and interactive video.

In addition, the conference will offer more than 80 one-hour presentations addressing the latest microcomputer applications for the handicapped. An exhibition is also slated.

The conference is produced by Closing the Gap, an international newspaper dedicated to microcomputer applications for the handicapped.

For more information, contact Budd Hagen, Closing the Gap, PO Box 68, Hendersen, MN 56044; 612-248-3294 or, from the metropolitan Minneapolis area, 612-341-8299.

## September 14-16 Corpus Christi, TX

**The Heart of Texas** computer show will run for three days in September at the Bayfront Plaza in Corpus Christi. The show will feature vendors displaying business and personal computer systems, robots, games and miscellaneous high tech products. Public seminars will also be offered.

For more information, contact Heart of Texas Computer Show, PO Box 12094, San Antonio, TX 78212; 512-681-2248.

## September 15 and 16 Secaucus, NJ

## September 22 and 23 Pennsauken, NJ

## September 29 and 30 Woburn, MA

Ken Gordon Productions has scheduled three local-area computer shows on the East Coast. The Secaucus show is easily accessible from New York City; the Pennsauken show is but a few minutes from Philadelphia and the Woburn show is accessible from both Boston and the 128 high tech belt.

All three shows will feature exhibitors and a computer and electronics flea market. For more information on any show, contact Ken Gordon Productions, PO Box 13, Franklin Park, NJ 08823; 201-297-2526.

## September 18-20 Washington, DC

The National Council for Education on Information Strategies announces that its **Federal Computer Conference** will focus on harnessing ADP technology. This year's conference is dedicated to helping federal ADP professionals meet the challenge of "harnessing the technology explosion... in a practical and cost-effective manner."

The conference will feature ten professional enhancement seminars, four managerial seminars, 12 workshops on new products and services, and special program tracks focusing on microcomputers, communications and software.

For details, contact Dallas Kinney, PO Box 368, Wayland, MA 01778; 800-225-5926 or, from within Massachusetts, 617-358-5181.

## September 20-23 New York, NY

The Big Apple will play host to **The Personal Computer Userfest**—a combination of the popular Applefest and PC'83 computer shows—at Madison Square Garden. The show will include 300 booths displaying Apple and IBM computers and workalikes, software, peripherals and accessories.

For details, contact Northeast Expositions, 822 Boylston St., Chestnut Hill, MA 02167; 617-739-2000.

## September 24-26 Anaheim, CA

Another **PCEXpo** show has been included in this year's roster; the latest addition will be at the Anaheim Convention Center September 24-26. The show is dedicated exclusively to the IBM PC market; exhibitors are comprised of manufacturers, original software producers and principal service vendors.

For more information, contact PCEXpo, 333 Sylvan Ave., Englewood Cliffs, NJ 07632; 201-569-8542.

## September 27-30 Washington, DC

CompuShows continues its fall series this month with the fifth annual **Mid-Atlantic Computer Show and Software Exposition** at the Convention Center in Washington, DC. CompuShows are designed to cover every aspect of the computer and office equipment market, from accessories to Z80 chips.



# CALENDAR

For more information, contact CompuShows Inc., PO Box 3315, Annapolis, MD 21403; 800-368-2066 or, from within the Annapolis area, 301-263-8044.

## October 1-3 Chicago, IL

The University of Wisconsin-Stout has announced that a national conference, **Discovery '84: Technology for Disabled Persons**, will be October 1-3 in Chicago.

The conference will present formal discussions, demonstrations and workshops. An exhibition is slated to round out the events. For further information, telephone the University of Wisconsin-Stout at 800-45-STOUT, or from within Wisconsin, 800-22-STOUT.

## October 2-4 Singapore

The theme of this year's **International Information Management Congress** is "Infomatics '84"; the location is

the Hyatt Regency in Singapore. The congress will feature a three-track program of super-sessions addressing micrographics, office automation and information management. The keynote presentation is entitled "The Micrographics World of Today—The Information World of Tomorrow."

For a complete program listing or more information, contact Infomatics '84, PO Box 34404, Bethesda, MD 20817.

## March 13-15, 1985 Call for Participation

The fifth annual **Microcomputers in Education Conference** has issued a call for participation. The theme of the conference is "Tomorrow's Technology"; emphasis will be placed on integration of computer languages and technology into the educational environment. For a copy of the speaker proposal form, please contact Donna Craighead at 602-965-7363.

# CLUB NOTES

## Milwaukee IBM PC User's Group

This IBM PC user's group is an assembly of Milwaukee area computer users that meets on a monthly basis. All meetings begin at 7 p.m.; Beginner's SIG meets at 6 p.m. and Spreadsheet meets at 9 p.m. Dues are \$1 per month or \$12 per year. New members can prorate dues to the end of the calendar year. For more information, write PO Box 305, Elm Grove, WI 53122.

## FIG Focuses on Member Service

Forth Interest Group of San Carlos, CA, is emphasizing member services as one of its prime objectives. A nonprofit, member-sup-

ported organization with more than 4800 members, the group offers a magazine, an on-line computer database, a job registry, user library, membership directory, speaker bureau, catalog of Forth software, educational tapes and more. For additional information on membership (\$15/yr., \$27/yr. foreign), call the FIG Hot Line at 415-962-8653 or write to FIG, PO Box 1105, San Carlos, CA 94070.

## New York Amateur Computer Club

The NYACC was founded in 1976 and is the largest computer club in New York City, supporting all types of microcomputers. A nonprofit group, it has been involved in cataloging and

distributing public domain software and sponsors the SIG/M along with the Amateur Computer Group of New Jersey. Dues are \$15 per year. For more information, write PO Box 106, Church Street Station, New York, NY 10008.

## Maine Compumania

Compumania is a Saco, Maine-based general computer user's club with a strong C-64 membership. It was formed in March 1983 to promote computer literacy and provide support to users. Compumania maintains a library of public domain software available to its members. Anyone interested in joining Compumania should contact Richard L. Nadeau at 207-282-7418 for information.

## Triangle dBase II User's Group

The Triangle dBase II User's Group of Raleigh, NC meets at 7:30 p.m. on the second Wednesday of each month at Dreyfus Auditorium, Research Triangle Institute, Research Triangle Park. A newsletter is published every two months and dues are \$10 per year. For further information, contact Dr. Richard W. Slatta, 2618 Davis St., Raleigh, NC 27608 or call 919-782-8926/Messages 919-737-2483; CompuServe EMail: 70156,404.

## New Club Mac

A new club for current or prospective Macintosh owners, software or peripherals vendors, Mac artists



# CLUB NOTES

and other interested persons has started in Colorado. Dues are \$35 annually, and members receive a free Macintosh communications program, a monthly newsletter, access to an on-line idea exchange and a professionally staffed help line.

Club Mac will also provide educational programs and support for local groups, listings of programs and accessories available for the Macintosh and a database of the interests and backgrounds of other Club Mac members.

For further information, write Club Mac, 735 Walnut, Boulder, CO 80302 or call 303-449-5533.

## Sanyo Seeks Local Chapters

The Sanyo User's Group/USA is interested in the formation of local chapters. They are also planning to sponsor, in conjunction with Sanyo, training seminars all over the country.

All of the local chapters formed will receive timely information updates from SUG/USA's national office.

Anyone who wishes to form a local chapter should contact Sanyo User's Group/U.S.A., PO Box 8069, Boston, MA 02114.

## Long Island Computer Association Inc.

The Long Island Computer Association Inc. is open to anyone, amateur or professional, with an interest in computers, computer applications, programming or related subjects. Dues are \$12 per year and include a monthly newsletter. LICA usually meets every month on the third Friday at 8 p.m. in Room 508, Building 500, New York Institute of Technology, Old Westbury Campus.

For more information, write LICA, PO Box 71, Hicksville, NY 11802.

# CLASSIFIEDS

national magazine targeted to kids with Apple computers. Send inquiries to Emerald City Publishing, PO Box 582, Santee, CA 92071.

FOR SALE: Sanyo 550, IBM-compatible, 128KB, one disk drive, 11-inch amber monitor. WordStar and CalcStar included. Also Basic programming language. All for only \$870. Ray, evenings, 203-255-3170.

FOR SALE: Used Texas Instruments 763 silent 700 printing terminal with 20KB bubble memory, RS-232C, works well. Best offer—at least \$500. Contact Irving Wolfe, 206-282-9598.

FOR SALE: Almost new, excellent Qume QVT-102 green 80x24 terminal, \$550 delivered, firm. Contact Irving Wolfe, 206-282-9598.

WANTED: Members for our new Adam Club. Experience new programs. Write Charles Kolin, 4835 Edsal, Cleveland, OH 44124.

FOR SALE: HP-85 computer with A/P ROM, assembler ROM, matrix ROM, I/O ROM, HP modem, 32KB EAM and complete documentation—\$1595. Contact Larry Nicholas at 805-688-1495.

FOR SALE: Diablo P-11 dot-matrix printer, new; parallel interface, italics, underlining, compressed/expanded characters, ten-inch carriage, 100 cps. \$274 (list \$649) w/warranty. Erin Williamson, Rt. 2, 35 Totteridge Drive, Wellford, SC 29385 or 803-877-9828.

WANTED: I would like to use my knowledge of hardware and software to take the "dis" out of physically disabled. If you have a special need or need information, write Timothy Mellwee, RR2, Box 462A, Dundee, IL 60118. Some possibilities are: foot switch, keyboard hand-steadying grid, voice synthesizers, head-tilt switches, Braille-encoded keyboards, talking keyboards, sound-sensitive menu-driven programs. Preferred systems to work with are Sinclair QL, Sinclair 2068, Com 64, TRS-Color and Apple. Please describe your needs in detail. I am also interested in PC board layouts and schematics of any peripherals for any computer. SASE appreciated for replies.

FOR SALE: TRS-80 Model 100 Portable Computer. 32KB RAM, disk/video interface (single drive), cables (printer, modem and cassette), bar code reader, Epson MX-80 printer with Graphtrax and numerous programs on disk. Asking \$1800 for the package (negotiable). Includes original packing, manuals, books and magazines. Mark Paulhus, 52 Dwight St., New Britain, CT 06051 or 203-224-3309.

FOR SALE: TRS-80 Model III Computer. 48KB RAM, two disk drives, printer cable, daisy-wheel II printer, SuperScript, Series I Editor Assembler (disk) and numerous programs on disk. Asking \$2200 for the package (negotiable). Includes original packing, manuals, books and magazines. Mark Paulhus, 52 Dwight St., New Britain, CT 06051 or 203-224-3309.

WANTED: Sharp PC-1500 pocket computer users who want to know how to convert your PC-1500 into a PC-1500A, how to extend its RAM, how to speed it up, how to define your own special characters for display, plotter and keyboard. For details, write to Christian Germelmann, Hauptstrabe 95, 3422 Bad Lauterberg 1, Germany.

FOR SALE: ADDS terminal model CONSUL 980-A. Best offer secures. Herbert, POB 725, New Brunswick, NJ 08903.

WANTED: College would appreciate donation of used Timex/Sinclair computer and equipment. For experimentation and class project. Will pay all postage. Imre Auersbacher, 41 King St., A2, Belle, NJ 07109.

WANTED: Atari computer hardware and software. Will buy your Atari gear or trade for mine. Originals only. Send list of what you have or ask for my list for trade. Allen Harberg, Box 38, E. Glastonbury, CT 06024.

FOR SALE: Osborne I computer peripherals and software; 64 KB, double-density drives (202KB each), screen pac (52, 80, 102 columns), Quadram Microfazer printer buffer (256 KB). Software includes: WordStar, Spellguard, Grammatik, Document/Plus, Footnote, MailMerge, SuperCalc, Superfile, dBase II, Math, M Basic, C Basic, Microlibrarian, Touchtype. A \$3000 plus value. Offers to Knowles, Salt Lake City, 801-363-4203.

FOR SALE: Magic Bind/Magic Index, WordStar version. A merge/formatter/indexer for CP/M-80, reviewed in March 84 *Microsystems*. New, with registration, does not work with my printer. Requires a Diablo/NEC compatible printer. \$250 (\$295 value). John D. Mill, 80 Old Lowell Rd., Westford, MA 01886, 617-692-4467.

WANTED: Back issues of 73 Magazine, October, 1960; Access, Vol. I, Nos. 1, 2, 4 and 5 (1982); Commander, 1983, and January, 1984. Buy, borrow or rent Access; others, buy only. Neil A. Benson, 6855 Lamar Ave. S., Cottage Grove, MN 55016-1630.

WANTED: Atari 800 and/or peripherals for Atari 800. Must be in good working order. Bob Hendrickson, 12710 Prospect Knolls Drive, Bowie, MD 20715.

# CLASSIFIEDS

Classified advertisements are free and are intended for use by persons desiring to buy, sell or trade used computer equipment. No commercial ads are accepted.

Advertising text must reach us 60 days in advance of publication date (i.e., copy for March issue must be received by Jan. 1). The publisher reserves the right to refuse questionable advertisements. Mail copy to *Classified Microcomputing*, 80 Pine St., Peterborough, NH 03458.

WANTED: Good-looking, living room-quality furniture for IBM PC plus monitor and Mannesmann Talley Spirit 80 printer. Prefer lockable, completely enclosed cabinet or desk. T. Woods, 2651 Pacific Way, Longview, WA 98632.

FOR SALE: Apple II Plus, 48KB, two disk drives with controller, green screen monitor III with stand, Integer Basic ROM card, microcromem II, Apple DOS tool kit, Apple-writer II, approximately 80 disks and assorted software. \$2295. HP41CV handheld programmable calculator includes four nicads with external recharger. \$225. Jim Stephani-dis, 2620 Cold Spring Lane, Indianapolis, IN 46222, 317-634-0951.

FOR SALE: Complete sets of *Microcomputing*, 80 *Micro*, *BYTE* and others. Make offer. F. Winters, 7 Fawn Lane, Hilton Head, SC 29928.

FOR SALE: Apple IIe software pack, \$100. Contains word processor (WordStar), database manager and dozens of games and utilities. Cost over \$300; not compatible with new (nonApple) hardware. C. Mann, 8412 Vision Lane, Walkersville, MD 21793 or call 301-845-8847 (eves).

WANTED: Good IBM PC and portable PC with modem. Also word processor and report generator. C. Mann, 8412 Vision Lane, Walkersville, MD 21793.

FOR SALE: Ham Radio Station for only \$295. National 183 RCVR Apache TX-1 XMTR. Shure Mic Eico Scope. Documentation and more. 301-845-8847 (eves).

WANTED: *MAD Magazine*/National Lampoon-type editorial and cartoon material for



When giants sneeze, small fry catch cold: on June 7, IBM upped the PC and XT's standard RAM to 256KB and cut prices about 20 percent. A typical PC with one drive and monochrome monitor fell to \$2520, an XT with monitor to \$4920. Portable PC prices fell \$200 (to \$2595 and \$3020 for one- and two-drive models, respectively), and the 128KB, one-drive PCjr dropped from \$1269 to \$999, the price dealers were selling it for anyway.

Rather than praise IBM for lowering costs and, more importantly, endorsing the 256KB configuration (rapidly becoming standard for today's powerful software), everyone in the computer press instantly jumped on the same angle: whether formerly lower-priced compatible makers like Columbia and Compaq could survive with Big Blue stealing their marketing strategy. (No, there's no flies on us in the computer press.)

Actually, IBM's move may fractionally accelerate the dreaded shakeout, but we've been talking about this shakeout for a year and it's coming more slowly than people expected. The few firms in financial trouble may be in slightly worse trouble (Eagle, for instance, is still staggering from the time and money spent to create a new ROM BIOS after IBM leveled a copyright injunction, and has lost 50 employees and negotiated a two-year plan to pay its debts).

Others will most likely trim prices a bit further—Leading Edge immediately cut its 128KB color PC and monochrome XT clones to \$2895 and \$3695, respectively—and hang on at lower margins.

Speaking of Leading Edge, the Canton, MA, company has announced a "new family of IBM PC compatible systems" for the home market, due late this year: the Peanut series. PCjr clones with real keyboards at less than PCjr prices? The idea just might succeed, though Leading Edge is often mentioned as a shakeout candidate.

It looks like the AT&T PC 6300, due in late June, will resemble Olivetti's 8086-based M24 (see *Comdex/Spring* story, p. 84), but there's talk of a more interesting machine built around Bell Labs' 32-bit WE 32000 superchip. The rumor of the month concerns an AT&T/Convergent Technologies



Technical Editor Dave Rowell poses to illustrate Tandy's door-to-door sales plan.

desktop with almost two megabytes of RAM, running both MS DOS and Unix, to fit between the 6300 and the 3B2/200 supermicro. If the stories of a June 26 AT&T press conference are true, next month's *Microcomputing* will have the facts.

Radio Shack's 8000-store sales force has long been the envy of competitors, but now Tandy is doing something no one else could imagine: the retailing champ will actually come to your house to show off a computer system. Starting in July in 13 cities, Tandy Home Education Systems will schedule appointments through participating Radio Shack Computer Centers (RSCCs); salespeople will visit families with school-aged children and demonstrate an under-\$1500 micro package.

The system includes a 64KB Color Computer 2, disk drive, modem, joysticks, your choice of two of six software packages (plus Color Logo and a

communications program) and RSCC training sessions for two family members. Tandy anticipates expanding the program to national status within three years.

Even as the papers reported plans for another 1000 layoffs, reducing staff from the 7800 of two years ago to about 1500, Atari was showing software designers a home computer in the \$1000 range, scheduled for launch around Christmas. According to the *Wall Street Journal*, Atari executives described the modem- and disk drive-equipped machine as only "70 or 80 percent compatible" with IBM's PC; Atari later said that report was in error but didn't offer clarification. Is it too soon to say, "too little, too late"?

Another *Journal* report quoted MicroPro International Corp. as saying fiscal third quarter income was "substantially less" than last year's \$2 million and that the WordStar factory had cut its permanent work force from roughly 500 to 400. A MicroPro spokeswoman blamed buyers' "wait-and-see" attitude caused by various companies' announcements of tantalizing software products.

After last February's modest debut in New Orleans, the producers of Softcon made epic plans for two shows in 1985. However, "the huge oversaturation of computer shows today," to quote Northeast Expositions' Bill Mahan, has pushed the software fest back to one event, scheduled for March 31 to April 3 at the World Congress Center in Atlanta.

Mahan hopes that Softcon will become "the premiere spring event in the computer industry," leaving the other half of the year to Comdex/Fall. Presumably, rival promoters would beg to differ on behalf of Comdex/Spring and September's National Software Show.

Is there anybody out there who isn't making educational software? The toy titan Fisher-Price has joined Spinnaker Software to produce math, language and learning skills programs in two age groups (three to eight and eight to 12), and children's TV host Fred (Mister) Rogers has lent his name to several CBS Software entries. □



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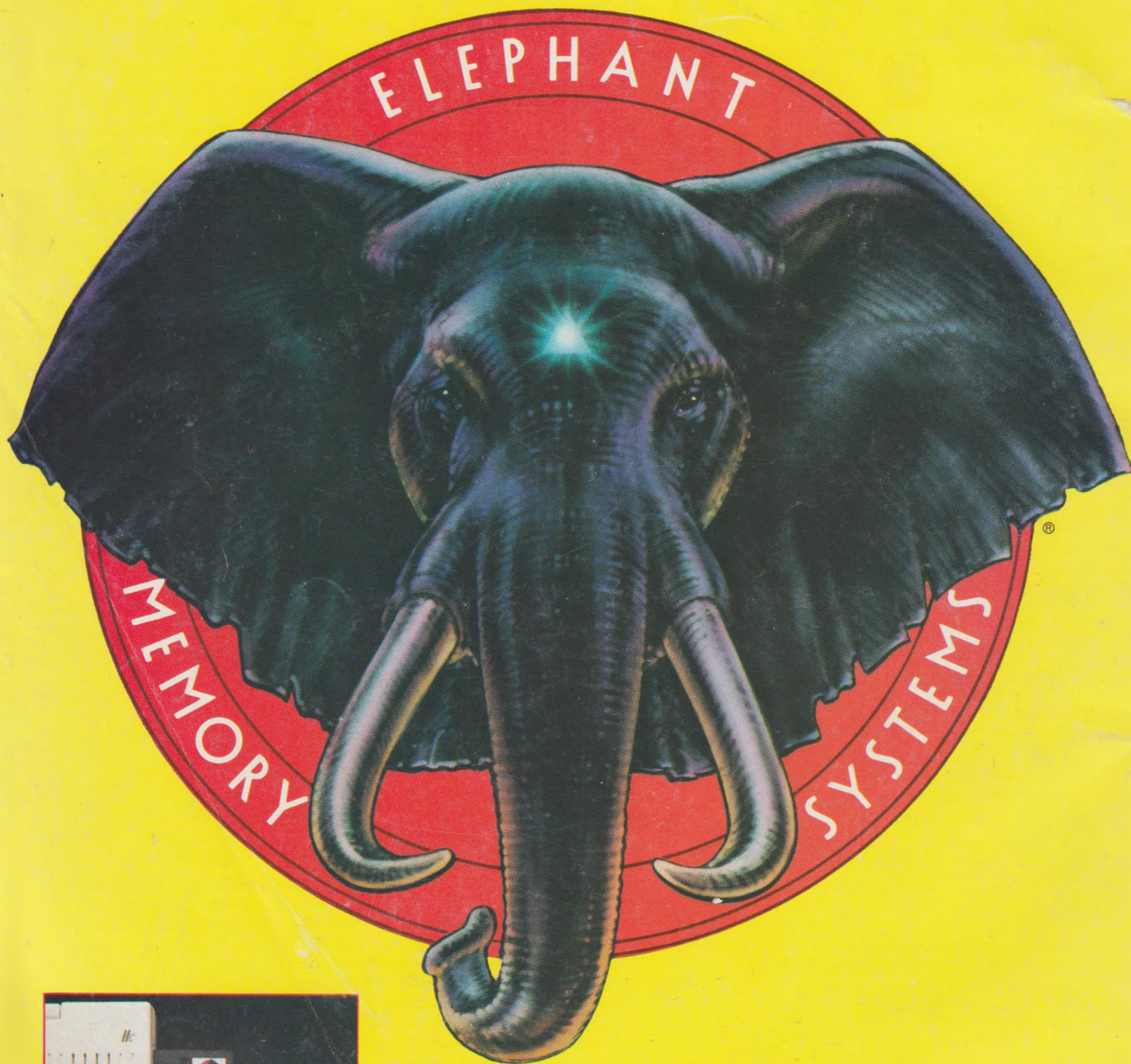
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